Light and Lighting

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CONTENTS

Lighting and Road Accidents

NOTWITHSTANDING all the publicity given to the number of casualties occurring on our roads, the repeated pleas for greater care on the part of all classes of road user, and the various devices to which we have had recourse in the cause of road safety, the toll of the roads remains far too high. There are, of course, many factors involved, and some seem so uncontrollable that a sizeable " hard core " of road accidents may have to be accepted as inevitable. The casualty liability of road users is greater by night than by day, as also is the fatality and serious injury liability. It seems reasonable to expect that these liabilities will be reduced by better street lighting, and yet, until recently, no analysis of accident statistics in this country has given much ground for believing that this expectation has been realised where improvements in lighting have been made. However, as reported at the recent A.P.L.E. Conference, of which we give an account in this issue, there seems now to be accumulating some direct evidence that differences in street lighting have an appreciable effect on night accident rates, although it cannot yet be claimed that the best modern street lighting is good enough to make the night accident risk no greater than the day risk.

Notes and News

Lighting and Electricity Supply

At the opening meeting of the new session of the Illuminating Engineering Society held at the Royal Institution on October 12, Mr. E. C. Lennox took office as president. The theme of Mr. Lennox's address was the importance of lighting to the electricity supply industry. The first part of the address dealt with the historical development of lighting and the supply industry, and the second part with utilisation.

When electric light sources were first introduced they were received with little enthusiasm, and their application was at first very haphazard; nevertheless, as Mr. Lennox pointed out, the supply industry was founded on electric lighting. The supply industry got off to a bad start and the original Electric Lighting Act of 1882 did not encourage its growth; the Act of 1888, however, offered more inducement to investors, and the foundations of the industry were laid. The early Acts made it possible for local authorities to purchase the electric light supply companies, which is why, before nationalisation, many of the undertakings were municipally owned.

In the early days the low supply voltage then available severely restricted the distribution of current, but the introduction of the three-wire system enabled supply voltage to be raised to 220, with the result that lamps could be operated at greater distances from the source of supply. Ferranti's work on alternating current, in spite of the setbacks it received, led the way to the use of smaller conductors and further helped to make electric lighting more widely available.

It was not long before "load factor," a term introduced by Crompton, became a matter of concern. Important though this was (and still is) it was not the only matter to worry the pioneer undertakings; the opportunities afforded to financial speculators, the high cost of wiring and the activities of "cheap-jack" electricians were also matters of importance. In addition the supply undertakings were very worried about the gradual improvements which were being made in the efficiency of lamps; though to-day such improvements are welcomed as further opportunities of providing better lighting, in those days an increase in efficiency meant a drop in revenue for the supply undertakings. Though new consumers were connected they were mainly those who required supply for a very short period each day; this led to the introduction of tariffs to encourage consumers to use electricity for longer periods.

In 1914 the installed plant was still less than 2,000 M.W. After the First World War still further increases were made in lamp efficiencies, but by now the use of electric lighting and an appreciation of the benefits of good lighting were beginning to grow —due in no small way to the activities of the Illuminating Engineering Society. Developments such as the coiled-coil lamp and discharge lamps were welcomed by the supply industry as means of increasing the use of electricity.

The application of electricity for lighting has grown rapidly; in just over half a century it has taken over all but a small part of the lighting field. During this period the cost of light has steadily fallen; in 1893 one penny purchased 440 lumen-hours; in 1954 it purchases 23,000 lumen-hours. This is the result of the efforts of both the electric lamp manufacturers and the electricity supply industry. Progress in utilisation, however, has been slower.

Lighting in the home is still, in spite of the multitude of appliances which are now available, the greatest single benefit which we can derive from electricity. Unfortunately, the very simplicity of electric lighting has to some extent hampered its development. In the majority of homes electric lighting still means a convenient switch and a hanging lamp, and of the 12,500,000 homes now supplied not more than 10 per cent. can be considered as well lighted. The average size of lamp used in the home is only 60 watts. The public just do not realise what a cheap commodity light is. The average annual amount spent on lamps and electricity for lighting is the same now (35s.) as it was in 1910. The percentage expenditure in respect of annual earnings has dropped from 4d. to 1d. in the pound; to double the amount of light now used would cost only an extra farthing per pound of wages.

It is to be regretted that the electricity boards do little to improve this state of affairs. It is inconsistent that though it is widely recognised that the average home lighting is poor, the staffs of electricity service centres are not encouraged to regard the electric lamp as an important sales item. The sale of appliances is all very well, but from a load point of view it should be remembered that the sale of a 100-watt lamp instead of a 60-watt lamp means an extra 60 units per annum as against a vacuum cleaner which will consume only five units per annum. There is a great need for a revival of the energy displayed

pre-war in bringing the advantages of better lighting to the notice of consumers.

In the lighting of industrial and commercial premises much progress has been made—but there is still much to be done. There are very many offices where even during daytime the lighting is inadequate and there are still too many shopkeepers who have yet to learn of the benefits of good lighting.

Street lighting is one of the most important services that the lighting and supply industries have to offer to the public. That our street lighting is not as good as it should be is not the fault of either industry (though they often have to take the blame). Our lighting engineers have produced lamps and equipment of the highest quality and performance; if the money was made available we could make our roads very much safer at night and at a cost less than the cost to the community of the accidents from which we now suffer.

In conclusion, Mr. Lennox said that the most urgent problem facing the electricity supply industry to-day is the same as that 60 years ago, namely, the improvement of load factor. Expensive plant must be used to the full; there can be no question of limiting peak demand and the valleys in the national load curve must be filled in. Advances in lamp efficiencies and lighting techniques lead to higher consumption and the gap between existing conditions and desirable lighting standards is great. The opportunities for better lighting and at the same time the improvement of load factor are greater now than they have ever been.

International Electrotechnical Commission

Amongst subjects discussed at the recent meeting of the International Electrotechnical Commission held at the University of Pennsylvania from September 1-16 were electric lamps and related equipment. Twelve nations took part in the discussions.

A draft specification for tubular fluorescent lamps was completed for circulation to the national committees for approval. The first edition of this specification will not deal with the colour characteristics of the lamps, but it is expected that work now in hand will enable this matter to be dealt with in the second edition. It has been provisionally agreed that for high-efficiency lamps there should be three standard colours, these lying within the temperature ranges 6,500-7,000 deg.K, 4,000-4,500 deg.K, and 2,800-3,200 deg.K. Before the colours can be defined more closely it will be necessary to obtain agreement on the method of measurement of the photometric and colorimetric characteristics of fluorescent lamps, and to this end a programme of tests involving the interchange of lamps between laboratories in several countries has been formulated.

A group of delegates at the I.E.C. meeting. Left to right Dr. A. B. Whitworth, A. G. Penny, F. J. Hawkins, Dr. J. W. Strange, W. J. Jones, J. F. Stanley, G. T. Winch and A. J. Whittenham.

Another matter discussed in Philadelphia was the question of interchangeability and safety of Edison screw-type lamps and holders. After many years of discussions provisional agreement has now been reached on a set of gauges which will ensure the " untouchability " of the shell of the cap and the metal parts of the holder when the cap is fully inserted in the holder. It has been generally agreed that the past requirements of some countries that the lamp should also be " untouchable " during insertion and withdrawal impose limitations which make international standardisation impossible. It is hoped that the gauges discussed in Philadelphia will be generally acceptable, although it is known that the legal requirements in force in Sweden and Finland will make it impossible for these countries to accept the new gauges at present.

A draft specification for ballasts for fluorescent lamps has been under discussion for some years and agreement was reached in Philadelphia on a draft which it is hoped will be finally acceptable in all countries.

Street Lighting Columns

More than 2,000 local authorities recently received from the Council of Industrial Design a list of approved designs of street lighting columns. The list is of designs submitted by manufacturers and approved by the CoID Street Furniture Committee and includes some 300 combinations of columns and brackets—a number which allows any public lighting engineer or local authority a reasonable freedom of choice.

It is understood that manufacturers have agreed to withdraw progressively from production columns originally passed by the R.F.A.C. which are not now acceptable. The manufacturers are to be congratulated on going so far to meet public criticism of their earlier efforts, though we hope for their sake that the CoID is allowed to retain its job of approving designs for some time (a job which it is doing well) so that in a few years hence manufacturers are not asked to scrap more expensive moulds which are now turning out columns with official blessing.

Decorative street lighting in Venice.

A.P.L.E. Conference, Eastbourne

Report on the proceedings of the recent annual conference of the Association of Public Lighting Engineers.

The Association of Public Lighting Engineers were favoured with exceptionally fine weather for their twenty-fifth annual conference, held this year at Eastbourne from September 14 to 17. The attendance was large; there were over 1,000 names on the official list of delegates, including visitors from Belgium, Eire, France and the Netherlands.

The first meeting was a private one, the Annual General Meeting of the Association, at which the retiring president, Mr. C. C. Smith, of Liverpool, presided. He announced the following elections for the year 1954-55:—

President: Mr. L. A. Doxey (Street Lighting Engineer of Leeds).

Vice-President: Mr. J. M. Waldram, B.Sc., A.M.I.E.E., F.I.E.S.

Member of Council: Mr. Granville Berry (City Engineer of Coventry).

Hon. Editor of Transactions: Mr. E. C. Lennox.

The venue of the conference was the Winter Garden, which, as will be remembered by those who attended the meetings of the Illuminating Engineering Society there in 1952, is a delightful building for gatherings of this kind. At 10.30 a.m. the meeting was thrown open to all delegates and Mr. Smith then formally inducted the new president into the chair and invested him with the chain of office. Mr. Doxey responded by expressing his appreciation of the honour which the Association and his colleagues had conferred upon him and said that the Association owed a debt of gratitude to the retiring president for his untiring work on its behalf. He then introduced the new vice-president as one who had achieved a world-wide reputation for his research on street lighting. Mr. Waldram, in reply, said that he much appreciated the distinction of being the first vice-president of the Association who was not a public lighting engineer; he regarded it as a practical recognition of the work of those whose activities in street lighting lay apart from the actual job of lighting the thoroughfares of a town or city. He then went on to say that further testimony to the mutual appreciation of each other's work by the illuminating engineer and the public lighting engineer was to be found in the fact that the president elect of the Illuminating Engineering Society was a distinguished past president of the A.P.L.E., *viz.*, Mr. E. C. Lennox.

At 10.45 a.m. the President welcomed the Mayor of Eastbourne, Councillor L. W. Pyle, J.P., and asked him to declare the conference open. The Mayor expressed his gratification at being able to welcome the delegates and at the beautiful weather they had brought with them. He referred to the many amenities in the town and to the pride which it took in the many beds of flowers to be seen everywhere. Turning to the objects of the Association he said that light spread cheerfulness and was a powerful preventive of accidents and crime. Eastbourne claimed to be one of the best lighted towns in southern England and in this connection the Mayor mentioned the fact that Mr. N. Boydell was formerly the Borough Electrical Engineer.

After the conclusion of the opening ceremony the Mayor and the president of the Association adjourned to the Pavilion and the adjoining grounds to inspect the exhibition of street lighting apparatus and equipment and the outdoor displays which had been arranged there. A description will be found elsewhere in this issue.

The President's Address

The main theme of the presidential address, delivered on Tuesday afternoon, was road safety and the contribution which could be made to it by the public lighting engineer. This theme, in fact, was dominant throughout the conference for, besides the remarks of the president, two of the five papers read at the technical sessions were devoted to this subject.

Mr. Doxey began by delving into past history, saying that the first record of a car accident was in 1896, when a woman was killed by a horseless vehicle stated to be capable at travelling at a speed of no less than eight miles per hour. He then turned to the present day when thousands were killed on the roads every year. Public lighting engineers everywhere, he said, were only too anxious to play their part in alleviating this deplorable state of affairs. He drew his hearers' attention to the fact that the number of vehicles on the roads had doubled since 1945 and that the traffic density in this country was now higher than that of any other country in the world. In the last decade nearly 51,000 people had been killed and 1,730,000 injured on the roads. It was also a fact that nearly 40 per cent. of road fatalities occurred at night time, although the hours of daylight greatly exceeded the number of hours after dark during which traffic was heavy.

Mr. Doxey said he did not suggest that the solution to the problem lay in improved street lighting alone. There was, in fact, no single solution, but he was confident that no greater single contribution could be made than by pursuing the Association's policy of bringing street lighting as speedily as possible up to the standard demanded by modern conditions. The main difficulties, he said, were not technical but financial; at the same time it was most important that local authorities should be advised by com-

petent street lighting engineers, and he urged that those authorities which were not in a position to engage a full-time official should avail themselves of the assistance which would be readily placed at their disposal by gas and electricity boards or the manufacturers of street-lighting equipment.

Mr. Doxey then went on to stress the importance to the lighting engineer of the nature of the street surface, a matter over which he had no control. He urged that there should be close co-operation between the road engineer responsible for the construction of the roads and the lighting engineer. At this stage he mentioned the prevalence of "street furniture" and touched on the very thorny subject of road forestation.

The concluding part of the address was concerned with matters of a more or less domestic nature, particularly the formation of two more local sections in the Midlands and in the North, the initiation of the diploma examination, and the possibility of reviving the Annual Report of Lighting Statistics.

Street Lighting and Safety

Immediately after the delivery of the president's address, Mr. W. Robinson, of the Electrical Development Association, read a paper entitled "Street Lighting and Road Safety." This was, in effect, a discussion of road accident statistics issued by the Ministry of Transport, in which the author made a number of comparisons of accident rates during daylight and after dark. One of these comparisons was presented in the form of a table showing the ratio of night to day casualty rates for different classes of road user. The ratio for fatalities varied from 2.8 for adult pedestrians to 1.2 for adult pedal cyclists, with intermediate values for other classes of user; for serious injuries it ranged from 2.1 to 1.0, while for slight injuries it was considerably less, viz., 1.3 to 0.6. In arriving at these figures no account was taken of the relative frequency of use of the roads by day and by night in the case of different classes of road user. Making reasonable assumptions with regard to this factor, Mr. Robinson concluded that the risk of a fatal accident by night was three times as great as that by day, while the relative risks of serious injury were as 2:1 and of slight injury as 1.5:1.

Graphs of the night-time and daytime adult pedestrian road deaths during each month of the year showed that while day fatalities remained fairly constant irrespective of daylight duration, the night fatalities followed the curve of darkness, reaching their peak in the three months when the nights were longest.

Next Mr. Robinson examined the trend in road casualties and compared the statistics for 1952 with those for 1945. There was a quite noticeably greater increase in night-time casualties than in those occurring by day.

The author then discussed the probable effects of various factors unconnected with lighting, including bad weather, the wetness of the road surface, intoxication and fatigue. The last two, he said, undoubtedly contributed towards the higher night-time accident rate.

Referring to the effect of inadequate street lighting on accidents, Mr. Robinson said that it was well known that well-lighted roads attracted traffic from other roads, and this often defeated attempts to relate the relighting of individual routes with accident reduction. It was reasonably certain, he said, that the true value of good street lighting would not be realised until it was more or less universal. On the other hand, poor street lighting was likely to give a false sense of security, as was clearly shown by the tendency for drivers to use only side lights in urban areas even when the lighting was insufficient to provide adequate visibility.

The modernisation of all existing traffic route lighting, said Mr. Robinson, would take some time even if the present financial and administrative obstacles were removed. He therefore suggested a list of priorities as follows:—

(1) A concentration of effort on the improvement of existing traffic route lighting;

(2) An improvement of the night-time effectiveness of pedestrian crossings;

(3) The immediate improvement of the lighting at junctions and cross-roads, where 50 per cent. of all accidents on restricted roads occurred.

Finally Mr. Robinson expressed the opinion that some Group A lighting, even of recent installation, was not satisfactory for a variety of reasons which he detailed. He urged that greater emphasis should be placed on uniformity of road surface brightness, rather than on the achievement of maximum brightness, and he made a plea for the use of light sources which would give greater tolerance in the siting of columns.

The discussion was opened by Mr. E. C. Lennox, who emphasised the significance of the great increase in night accidents, especially fatalities, as compared with those occurring by day. He said there was no doubt that, whatever other contributory causes there might be, the chief trouble of the night driver was lack of visibility. This increased his reaction time and therefore the risk of accident. Mr. Lennox drew attention to a change of wording in the new Highway Code, where the driver in a built-up area was instructed not to rely on his side-lights alone unless the street lighting was good enough for him to do so. This indicated a very significant change of viewpoint which was worth noting. Drives for safety on the roads, said Mr. Lennox, were very valuable, but to his mind a drive for better street lighting might produce greater results. We had the technical knowledge and the equipment needed for street lighting of a very high standard; all we needed was the chance to use them, and here he referred to some of the anomalies of the present system of financing street lighting in this country. Finally he questioned whether the street lighting was always put on early enough in the evening, at any rate in some districts.

Mr. R. Bell referred to the great increase in the number of vehicles on the roads, and said that we needed motor roads, more by-passes, and better lighting on the existing roads.

Mr. F. H. Pulvermacher contended that we could not afford inadequate street lighting. The cost of accidents to the country had been estimated at £150,000,000 per annum, and in view of this it was absurd to talk about not being able to afford good street lighting.

Mr. Osgood, of Luton, caused a stir by saying that in his view the accident rate was not dependent on the lighting but on many other factors, the chief of which was bad driving. He was supported by Mr. Slight, of Wallasey, who wanted the Ministry of Transport to experiment by relighting the whole of some town to a high standard and studying the accident rates before and

after. Both speakers, however, were clearly in favour of good street lighting.

Mr. Robinson in his reply dealt with a number of the points raised, and pointed out that the figures he had used were not simple numbers of accidents but ratios and the relationships between night and day figures. He disagreed that improved lighting, by tempting drivers to greater speeds, might actually increase accidents, but he pointed out that traffic was attracted to well-lighted streets and so the density, and therefore the total number of accidents might be increased.

Moving a vote of thanks to the author, Mr. N. Axford endorsed what Mr. Lennox had said about lighting-up time and urged public lighting engineers not to cheese-pare in this matter, especially in winter.

Annual Luncheon

At the annual luncheon held at the Winter Garden on the Wednesday the guest of honour was Sir Roger Duncalfe, President of the British Standards Institution, who in the speeches following the lunch proposed the toast of the Association. Previously Mr. Norman Boydell had proposed the toast of the County Borough of Eastbourne and the Guests, to which the Mayor of Eastbourne had replied. The reply to Sir Roger Duncalfe was made by the President, Mr. L. A. Doxey.

Novel Fluorescent Street Lighting

The programme for Wednesday was entirely non-technical, except for the tour of street lighting installations in the evening, but at the session on Thursday morning Mr. B. C. Ossitt, of the S.E. Electricity Board, read a most interesting paper on "Some Unusual Uses of Fluorescent Lamps in Street Lighting." Readers of *Light and Lighting* will remember an account in the issue for April, 1951, of a trial installation of fluorescent lamps mounted on the buildings at the sides of a rather narrow business street in Eastbourne. Mr. Ossitt described the experimental work carried out when this scheme was being developed, and he mentioned some of the advantages of such an arrangement in a fairly narrow street with narrow pavements and with a maze of buried services which made the proper siting of columns almost an impossibility. Many delegates visited this installation (South Street) to see the results for themselves and were impressed with the good visibility and with the comparative freedom from glare due to the fact that the lamps were mounted with their axes horizontal and parallel to the line of the street.

Another unusual installation described by Mr. Ossitt, and also to be seen in Eastbourne, consisted of post-mounted vertical cylindrical fittings some 6 ft. high, each containing four vertical fluorescent lamps and mounted at a height of 25 ft. This installation was in Devonshire Place, a very wide street of the boulevard type, with flower beds along the centre and sides and bordered with a good class of hotel, so that it was essential that the daytime appearance should not be in any way impaired, e.g., by the erection of columns with horizontal fluorescent fittings of the orthodox type. The columns were erected at a spacing of about 70 ft. along the central reservation only and the effect was certainly pleasing both by night and by day.

The author emphasised that he was very far from urging the abandonment of efficient fluorescent installations of an orthodox character in the majority of cases, but he said that there were, nevertheless, many roads and city streets which lent themselves better, for one reason or another, to an installation with unusual features. He included in this category the column with a fitting inclined at an angle of some 10 to 15 deg. to the horizontal, and showed how well these looked in a housing estate or on the roads of a new town. Such inclined fittings have, of course, been very popular on the Continent ever since the introduction of fluorescent street lighting.

Another unusual installation mentioned by Mr. Ossitt was that recently put up in the City of London in the neighbourhood of the Guildhall. The fittings, mounted vertically on the faces of the buildings, housed vertical fluorescent lamps in a "Perspex" cover, with sealed-in refractor panels to give some degree of light control. The author said that this installation had proved so successful that a further 100 lanterns were to be installed.

Referring to the various installations he had described, with lamps mounted on the buildings, the author said that while such a system was very useful in comparatively narrow streets it would probably not be suitable for wide streets or on roads where trees might prevent the light from reaching the road surface.

Towards the end of his paper Mr. Ossitt referred to a recent development on the Continent, particularly in Germany, where very high columns carried rather bulky "umbrella" or "roof-top" fittings in which a number of fluorescent lamps were disposed radially under the horizontal canopy, while others were mounted vertically around the stem. He said that an experimental fitting of this kind had been built by the S.E. Electricity Board a short time ago and was now doing duty at a roundabout at Twickenham.

In his conclusions the author ventured into the realm of prophecy and gave it as his opinion that it was only a question of time before the favourite form of street lighting would be by fluorescent lamps. He looked forward to the day when each installation would be planned to suit the particular street it was designed to light and when the town planner would think in terms of built-in street lighting. He showed a slide in which the artist had given his fancy full rein by depicting a street lit entirely by the fluorescent materials which coated the walls of the buildings on either side (the source of exciting radiation was not shown).

Dr. H. H. Ballin opened the discussion by saying that the paper was a challenge to the orthodox lighting engineer and a call to him to examine his fundamental ideas. This was a good thing, but in the speaker's opinion there was, in fact, little that needed revision. It appeared that with wall mounting considerable reliance was placed on reflection from the opposite buildings and this might well result in a considerable loss of efficiency. Dr. Ballin pointed out that in most of the photographs shown the road had a slight bend and this greatly assisted in the production of a bright road surface. Would the results be as satisfactory on a perfectly straight road? It was good to experiment with unorthodox schemes but their adoption in practice should be approached with a good deal of circumspection.

Following a similar line of thought, Mr. A. W. Christie, of the Road Research Laboratory, showed some slides of city streets with wall-mounted fittings, and pointed

out that, especially under wet conditions, there might be extensive areas of the roadway left dark.

Mr. A. A. Allan, of the S.E. Scotland Electricity Board, referred to a very successful installation at Haddington, while Mr. E. H. Jesty, of the London Electricity Board, asked if there was any difficulty about obtaining way-leaves to mount the lanterns on the building fronts.

M. L. Gaymard, of Paris, spoke of experience in France on unorthodox fluorescent installations. Post-mounted vertical fittings had been used and trials were being made with wall-mounted fittings containing vertical lamps. He did not know of any attempts to use wall-mounted horizontal lamps.

Mr. J. M. Waldram said that the increasing use of darker and rougher road surfaces, and the adoption of arrangements such as those described by the author, meant that the reflecting properties of the road surface were not being used as effectively as in the past; it was therefore necessary to use more lumens per 100 ft. of road, either by increasing the power of the lamps or by reducing the spacing. Mr. R. Parker, of Aberdeen, emphasised that with wall mounting it was necessary to fix on a maximum value for the spacing and be prepared to reduce this very considerably to suit the buildings on which the fittings were mounted.

Mr. C. C. Smith, of Liverpool, asked how many lumens per 100 ft. should be provided and Dr. Walsh asked what were the advantages of wall mounting over central suspension with cut-off fittings at a similar close spacing.

The author replied to a number of the questions raised during the discussion. In particular he said that with wall mounting at least 4,000 lumens should be provided per 100 ft. of roadway. He pointed out that maintenance was easy and required only a ladder instead of a tower-waggon. No reliance was placed on the reflection from opposite buildings though this, naturally, could be of considerable assistance.

A vote of thanks, proposed by Mr. H. Carpenter, of Blackpool, was carried by acclamation.

Economy by Improvement

At the conference in 1952, Mr. N. Hudson read a paper (see *Light and Lighting* for November, 1952, p. 402) in which he advocated bringing up to date the many miles of streets with a low standard of lighting, rather than continuing to waste money on inefficient equipment for the many years which were likely to elapse before it could be replaced with an entirely new system. This theme was pursued further by Mr. A. V. Horsfall of the West Midlands Gas Board in his paper "Further Details on a Wise Compromise in Street Lighting," read at the technical session on Thursday afternoon.

The author began by pointing out that the lighting of Group B roads had been very much neglected in comparison with that of traffic routes, although many of them now carried a far greater density of traffic than was the case before the war. This was undoubtedly due in no small measure to financial limitations; the amount available for improving street lighting was strictly limited and so progress could not keep pace with the needs of the situation. This state of affairs, said Mr. Horsfall, made it very desirable to examine any way in which improvements could be effected with the smallest drain on public funds. He referred to the very large number of gas lamps still in use for street lighting and to the wastefulness of retaining obsolete equipment when, by conversion to modern types, the same amount of gas could produce 25 per cent. more light and distribute it more advantageously over the highway. The cost of maintaining modern lamps, too, was often much less than that for similar services to old installations.

Following up this general thesis, Mr. Horsfall gave detailed estimates of the cost of converting the lighting of different classes of road from an out-of-date system to (a) a modern gas installation, (b) an electric system. In the case of a heavily trafficked street more than 35 ft. wide between kerbs, the cost of modernisation by gas was approximately £29 per column, while that for conversion to 140-watt sodium was £64, asuming that the old columns were used in both cases. If, however, the old system was one with low mounting, new columns would be required and the respective costs would be about £60 and £83 for the two schemes.

In the case of trafficked roads less than 35 ft. wide Mr. Horsfall gave a number of comparisons, some of them based on the retention of a mounting height of 13 to 15 ft., others on the increase of the height to 25 ft. In all cases the cost of conversion to a modern system of gas lighting was considerably less than that of conversion to electric lighting, either by tungsten or by sodium lamps.

In the last set of comparisons Mr. Horsfall took the case of a residential road and here the cost of modernisation with gas was under £15 while that of conversion to electricity (100-watt tungsten) using the existing columns was just over £43. The author explained very fully the way in which he had arrived at the estimated figures for the costs of the various items included in his tables.

Mr. N. R. Junkinson of the North Thames Gas Board opened the discussion by saying that very many installations, both gas and electric, were much below the standard recommended for Group B lighting, not only as regards the lumen output provided per 100 linear feet of road, but also in many other respects. He showed photographs of a re-lighted street by day and by night. There was often a fear, he said, that the improvement of an existing installation might delay the provision of lighting to a really high standard, but in many cases this was a mistaken policy for in present circumstances the full programme of re-lighting in a district might well take many years.

Several speakers, including Mr. J. Wilson of Paisley, Mr. E. J. Cook of the N.W. Electricity Board and Mr. J. T. Kilner of Prestwich, criticised the costs quoted by the author and it was pointed out by them and by Mr. E. H. Jesty of the London Electricity Board and Mr. J. S. Smythe that, for a true comparison of costs, capital charges and running costs should be combined.

Mr. E. Stroud urged that poor lighting should be converted to a satisfactory system as rapidly as possible so as to improve safety on the roads.

Mr. F. C. Smith emphasised that many installations, both gas and electric, were far too old. What the author had done, in effect, was to ask local authorities to go into the costs of bringing such installations up to date and to suggest that they might well be surprised at the economic figure at which this could be done.

In his reply Mr. Horsfall said that running costs varied so greatly that it was impossible to include such

figures in the paper. It was, however, possible to say that with an out-of-date installation comparatively inexpensive modernisation might well provide up to 80 per cent. more light at a much lower running cost.

Mr. F. C. Smith proposed a vote of thanks to the author.

Controllers

After a brief interval the president called on Mr. A. J. Ogle, of the North-Eastern Electricity Board, to read his paper on "The Control of Electric Street Lamps." The author was evidently both an expert and an enthusiast on his subject and gave his audience a description of methods of control which was both detailed and comprehensive.

After a brief reference to hand control, he passed on to the control of lamps, either individually or in groups, by time switches. These, he said, could be clockwork, hand wound or electrically wound. In the latter case winding might be continuous or it might be periodical. Time switches, in which the times of switching on or off had to be set by hand to suit the season of the year, were now largely replaced by instruments with a "solar dial" in which this adjustment was made automatically.

Instead of using clockwork, a time switch might be driven by a synchronous motor. During a period of power cuts this system had the disadvantage that after any interruption of the supply all the clocks were slow and had to be reset by hand. This could be obviated by providing a spring reserve in addition to the motor, but such an instrument was more expensive.

The author dealt with the maintenance necessary, and said that if it was properly maintained a time switch should last 20 years or more. He described systems of group control by time switch, mentioning control by means of a pilot cable. In connection with the cascade method, he said that the objection often made to it, *viz.*, that a failure in one section put out all the subsequent sections, could be overcome by the use of a special "latching" type of contactor. He also referred to control by light-sensitive devices, and pointed out that if a section of the lighting had to be switched off at midnight this needed a control which was independent of the photo-cell control.

The second part of the paper was concerned with systems depending upon the injection into the distribution network of some signal that would operate local switches. There were, said the author, two main groups of such systems, *viz.*, those in which high frequency alternating current impulses were injected and those in which the a.c. network was given a d.c. bias by means of low voltage d.c. injection.

Dealing with the latter type of system first, Mr. Ogle said that the usual method was to connect a six-volt car-type battery between the star point of the supply transformer and the distribution neutral for about 2 sec. By means of a change-over switch the direction of this bias could be reversed. A suitably polarised relay connected to any phase conductor and the neutral at a distant point could, in this way, be made to switch on a street lamp with a signal of one polarity and switch it off with the opposite polarity. The author described the apparatus required at the sub-station for applying the bias and at the lamp or group switching point for responding to the signal with the appropriate switching action. If half-night switching was required, this was operated by a special relay with a thermal delay device which required a signal of 20 sec. duration to operate it.

Turning to the h.f. impulse systems, Mr. Ogle said that the frequencies generally used were between 300 and 800 cycles/sec. The signal was supplied by a special small h.f. alternator feeding an injection transformer connected between the star point and the neutral of the system. Again, the switching was performed by means of selective relays which responded only to a signal of the proper frequency. The paper had, as appendix, a very useful table, in which the costs and the relative advantages and disadvantages were shown for each of 11 control systems.

It was unfortunate that the presentation of the paper occupied such a large part of the time allocated to the session that many speakers who were anxious to take part in the discussion were unable to do so. The opener was Mr. A. E. Morgan, of the London Electricity Board, who commented on various points and mentioned that every electricity board had a staff of meter mechanics. These men were well qualified to maintain time switches, and he suggested that any local authority not in a position to do its own repair and maintenance work should make appropriate arrangements with its local board. He referred in particular to the h.f. system of control, and said that in his opinion such a system was economically justifiable where the number of lamps to be controlled was not less than 3,000.

Mr. E. Bates, of the Eastern Electricity Board, disagreed with some of the author's figures of cost and, referring to the figures given in the table for remote control systems, he pointed out that the number of lamps on a single low-voltage network was now seldom more than 40 instead of the 100 quoted.

Mr. H. Lloyd Williams said that the cost per lamp of injection equipment naturally went up as the number of lamps controlled was reduced, and this was sometimes a complicating factor when changes took place in the area supplied from a particular sub-station.

Mr. W. H. Shaw, of Coventry, advocated control by radio, which, he said, could be applied over areas of up to 20 square miles. The cost of the receivers which switched on the lamps was of the same order as that of a time switch.

In his reply the author dealt with criticisms of his figures of cost, which, he said, were based on actual experience. He reiterated a suggestion made at the end of his paper that the cost of a remote control system might be shared between the street lighting and the other uses to which it could readily be adapted.

The vote of thanks was proposed by Mr. A. F. Cork, of the Manchester City Council.

Accident Statistics

At the technical session on Friday morning the subject of road accidents was dealt with again in the first part of a paper by A. J. Harris and A. W. Christie, of the Road Research Laboratory. The authors set themselves the task of trying to determine (a) how much of the increase in the night accident rate was caused by darkness (as this would indicate the maximum effect that could possibly be produced by street lighting) and (b) what was actually the effect of an up-to-date standard of street lighting on the night accident rate. They, like Mr. Robinson, analysed the figures given by the Ministry of Transport, but with particular reference to the effect of Summer

Time. This clock change made it possible to compare the accident rate for a certain hour in the day when this hour was in daylight with the rate when the same hour was in the night. It was found that the effect of darkness was to multiply the adult pedestrian casualties by nearly three to one. A study of the total adult casualties for the ten-week period preceding or following the beginning and end of Summer Time in the years 1950-2 led to ratios of dark/light casualties which generally confirmed this result. The conclusion drawn by the authors was that it should be possible, by improved visibility, to reduce adult casualties at night in built-up areas by about 37 per cent. and fatalities by about 67 per cent.

To answer the second question was a much more difficult matter. The effect of any relighting scheme was often obscured by other factors. Comparisons of the figures for well-lighted and badly lighted towns gave an indication that the former had a smaller proportion of their casualties after dark. An important side result of attempts to answer this question was that roundabouts had a much larger proportion of accidents in darkness than other types of junction in non-built-up areas.

Summing up this section of their paper the authors, with characteristic caution, said that evidence now seemed to be accumulating in this country to show that differences in street lighting might well have an appreciable effect on the night accident rate.

Road Surface Characteristics

The second part of the paper described research on the reflection characteristics of road surfaces. From laboratory measurements on a particular surface it was possible to prepare diagrams showing the lines of equal luminance on a roadway of that kind when it was illuminated by a street lamp of uniform light distribution and the observer was in a given position relative to the lamp. Diagrams of this kind for typical road surfaces were shown and the effect of texture ("even" or "peaky" and, in the latter case, "coarse" or "fine") was discussed. In particular it was mentioned that in dry weather it did not matter whether the peakiness of the surface was fine or coarse, but in wet weather the latter was much to be preferred from the lighting point of view because the bright patches remained broad instead of contracting into narrow streaks.

Referring then to the need for making roads non-skid, the authors said that it seemed unlikely that street lighting engineers could expect roads to provide, in future, bright patches much longer than those given by such surfaces as rolled asphalt with pre-coated chippings or machine-finished concrete. This indicated that it was not desirable to use street lanterns of the high angle beam type. On the other hand good non-skid surfaces were available which would give a satisfactory result with the medium angle beam type of distribution.

The discussion was opened by Mr. Granville Berry, who remarked that this was the first occasion on which the Road Research Laboratory had said that improvement in street lighting would reduce accidents. He referred to the wealth of American data and said that if the accident rate in this country could be reduced by only 10 per cent. the financial saving would more than pay for all the improvements in street lighting that were needed. Accident statistics following relighting schemes might be misleading because it was well known that good lighting attracted traffic. Mr. Berry referred to the use of bands of fluorescent lighting across roads in Holland and asked if there were advantages to be gained by increasing the overhang in a fluorescent system.

Mr. S. J. Chamberlain, of the Traffic Department, New Scotland Yard, said that in badly lighted areas people tended to avoid night driving, and he therefore felt that one result of good street lighting might be a slight relief of the daytime traffic congestion. He criticised the lighting at many roundabouts and said that, in his opinion, the siting of posts on the outsides of bends might be misleading to a driver unless it was done with discretion.

Mr. J. M. Waldram, after remarking that the matters criticised by the last speaker were dealt with in the Code, said he felt that it would be most valuable to take a whole area, uniformly well lighted, and study the accident statistics for an hour in the day which was light at one season of the year and dark at another. He suggested that the discomfort generally felt when driving during twilight was occasioned by the fact that, while by day the illumination was good but contrasts generally poor and at night the reverse held, during twilight both illumination and contrasts were poor.

Mr. Slight, of Wallasey, asked about the reflection characteristics of granite-sett roads. Mr. C. C. Smith, endorsing what had been said by previous speakers, urged that statistics should be interpreted with great care. He asked whether the reduction in the length of the bright patch provided on a non-skid road surface was, in fact, an argument in favour of cut-off lighting.

Mr. E. P. McBretney, of Scunthorpe, asked whether there would be an advantage in grading the lighting at the outskirts of a built-up area when the road passing through it was unlighted outside the area, and Mr. F. C. Smith referred to the increase in the average age of the population and its possible effect on the accident rate.

In his reply Mr. Harris referred to several speakers who had asked about statistics which were more detailed in one respect or another. He pointed out that the numbers became smaller and smaller, and therefore statistically less and less useful, as they were broken down. Mr. Christie agreed with Mr. C. C. Smith that the use of non-skid surfaces favoured the adoption of cut-off lighting. He said that the bars of fluorescent lighting referred to by Mr. Berry were at long spacings, of the order of 600 ft., and supplemented a cut-off installation by giving a useful background brightness on the road under wet conditions.

Mr. E. C. Lennox proposed a hearty vote of thanks to the authors.

Conclusion

Immediately after this technical session the closing meeting of the 1954 Conference was held. The president expressed the thanks of the Association to all who had helped to make the conference so successful and so enjoyable. He was followed by Mr. A. S. Janssen, of Holland, who, on behalf of the overseas visitors, thanked the Association for the opportunity of attending and listening to such an excellent series of papers and discussions. After the enthusiastic adoption of a vote of thanks to the president, proposed by Mr. C. C. Smith, the meeting closed with an announcement that in 1955 the Association would visit Folkestone from September 13 to 16.

Display of Street Lighting Equipment

Exhibits at the A.P.L.E. Exhibition at Eastbourne.

General view of the outdoor display at Eastbourne.

AEROPLASTICS, LTD., displayed their "Carrick" and "Kyle" lanterns which are manufactured from acrylic sheet and are of the totally enclosed type. The "Carrick" is for Group "A" lighting and is intended primarily for use with a 140-watt sodium lamp though the 85-watt sodium lamp may also be used. The "Kyle" is of similar design but smaller and is intended for Group "B" lighting with 60- or 45-watt sodium lamps.

THE BENJAMIN ELECTRIC, LTD., showed a selection of their range of floodlighting fittings and reflectors for secondary road street lighting lanterns. An interesting exhibit was a modified design of the "Duoflux" floodlight for use with raising and lowering gear in order to facilitate cleaning and servicing.

In addition to a range of street lighting lanterns and lamps, the BRITISH THOMSON-HOUSTON CO., LTD., showed their new 25-ft. concrete column. This column has been designed for use with the new range of B.T.H. street lighting lanterns and was shown equipped with an "Amber" sodium refractor lantern for Group "A" lighting (see p. 328). Essentially plain in shape, the column has a "clover-leaf" cross-section and tapers from its widest point, which is approximately a quarter of its height from the ground. Single and double arm brackets are available and arrangements are made in the base for the housing of control gear.

Mr. L. A. Doxey (President), the Mayor of Eastbourne and Mr. J. M. Waldram (Vice-President) at one of the stands.

Other lanterns shown included the "Sapphire" mercury reflector lantern (see p. 326) and a fluorescent 5-ft. 3-lamp lantern (see p. 321).

The principal exhibit of the AUTOMATIC TELEPHONE

AND ELECTRIC CO., LTD., was their "Rythmatic" ripple control system for the centralised remote switching of street lighting. The system makes use of the distribution network to convey voice frequency currents under push-button control from the street lighting department; these currents operate control switches on the lamp standards. The system can also be used for the control of "all-night," "half-night" and "prior-dawn" lamps.

BRIGHT, SON AND CO. (Clerkenwell), LTD., demonstrated their repair service for gas and electric time switches.

On the stand of the BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION a number of charts and diagrams illustrated graphically the heavy and increasing toll of road accidents due to inadequate street lighting. These showed that between dusk and midnight an average of 2½ times as many adult pedestrians are killed each hour on the roads as during each hour of daylight. Nearly all these deaths occur on roads with street lighting, the inference being that bad street lighting is more dangerous than none at all.

THE AUTOMATIC LIGHT CONTROLLING CO., LTD., who have been making street lighting controllers for over 50 years, showed a range of their "Gunfire" time switches and controllers.

CONCRETE UTILITIES, LTD., showed in the outdoor display a selection of their columns for Group "A" and Group "B" lighting.

The ENGINEERING AND LIGHTING EQUIPMENT CO., LTD., showed a range of their lanterns, including the 'Golden Ray Mk. III" totally enclosed lantern for 140-watt sodium lamps and its smaller counterpart for 50- and 45-watt sodium lamps. Other lanterns for side road lighting were also shown.

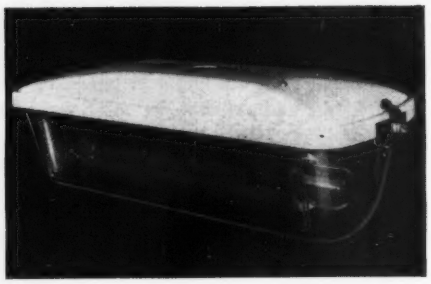
In the lanterns shown by FALK, STADELMANN AND CO., LTD., extensive use is made of aluminium alloys and stainless steel and of glass or "Perspex" for refractors and enclosing bowls or covers according to the light source and lantern design. Two new lanterns for Group "B" lighting shown for the first time were the "Wellesley" (see p. 337) and the "Dragonfly" (see p. 339).

The FORD MOTOR COMPANY, LTD., showed a 25-ft. three-stage tower wagon vehicle, the tower of which is made by the Eagle Engineering Co., Ltd., and a diesel engine truck carrying a 600-gallon vacuum and pressure outfit for syphon emptying manufactured by Allan Taylor (Engineers) Ltd.

FRANCO TRAFFIC SIGNS LTD., showed the latest of their bollards, known as the 4E, the design of which is based on recent recommendations of the Ministry of Transport. These recommendations are intended to reduce production costs without sacrificing efficiency or appearance. Also shown were an external lighting fitting ("Exlite" type III) for the lighting of traffic signs, and signs for the London through routing scheme.

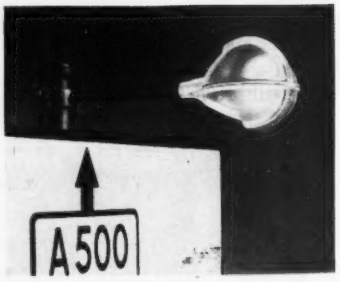
The main purpose of the GAS COUNCIL exhibit was to show how outdated street lighting could be modernised with the least impact on public funds. A chart showed the costs of installing modern gas lighting equipment and indicated how a better and cheaper service could be provided without scrapping completely existing equipment.

The new pre-stressed concrete columns of the GENERAL ELECTRIC CO., LTD., were shown for the first time. These are the "Altus" and "Brevis" designs for

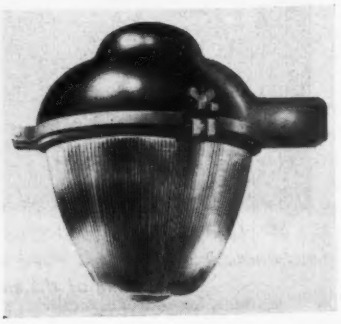


Above: Aeroplastics "Carrick" lantern.

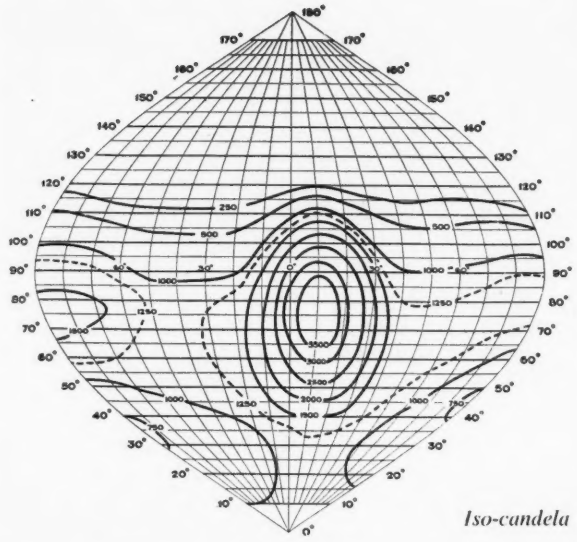
Right: B.T.H. concrete column.



Franco "Exlite" type III external sign lighting fitting.



Holophane "Acorn" bowl lantern.



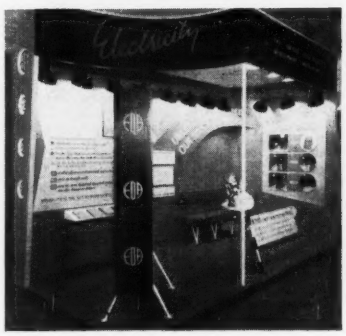
Iso-candela diagram of Holophane "Acorn" lantern with 400-watt fluorescent bulb lamp.

mounting heights of 25 ft. and 15 ft. respectively. Brackets for side or top entry are available for both types which can also be used for post-top mounting. The "Altus" can also be supplied with double arm brackets.

Lanterns shown by the G.E.C. included an improved cold cathode lantern housing five 67.5-watt cold cathode tubes. There was also a new cut-off lantern for side road lighting to take 60- to 200-watt tungsten lamps or 80- or 125-watt mercury lamps. Amongst lanterns for main road lighting was a new aero-screened lantern for 250/400-watt mercury lamps.

GOWSHALL LTD., displayed a variety of illuminated guardposts including their "Sheerline" made to meet the recommendations of the Ministry of Transport. The "Signlite" external lighting unit and other auxiliary equipment for the lighting of road signs were also shown.

HOLOPHANE LTD., showed a 14-in. "Acorn" lantern in which was used the newly introduced 400-watt bulb-



Above: E.D.A., Venner and Benjamin Electric stands at the exhibition.

Left: G.E.C. "Altus" column.

type fluorescent lamp; this relatively small lamp has a light output of more than four times that of the 5-ft. tubular fluorescent lamp. The "Acorn" lantern includes an internal prismatic refractor which controls the upward light from the lamp and has a smooth-surface bowl which projects light in a two-way, non-axial, high-angle distribution. (See iso-candela diagram.) The generous light output and good colour rendering provided by this lamp make it very suitable for busy urban areas.

Holophane also showed a new house-side lantern (see p. 340) designed for Group "B" lighting mounted on the walls of buildings fronting on to narrow streets.

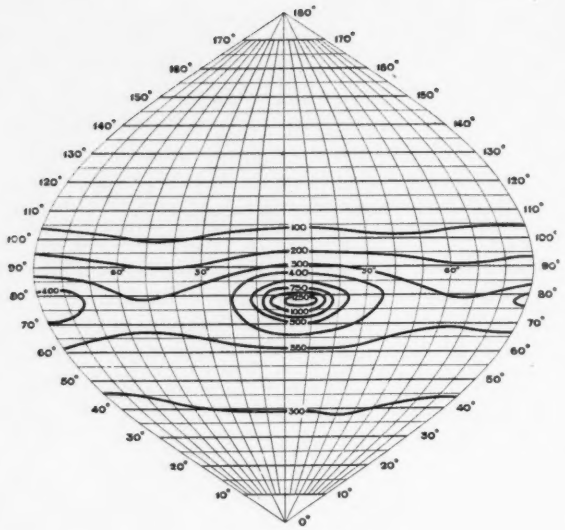
Though Holophane prismatic refractors in various designs are widely used in connection with Group "B" lighting none caters completely for the present day

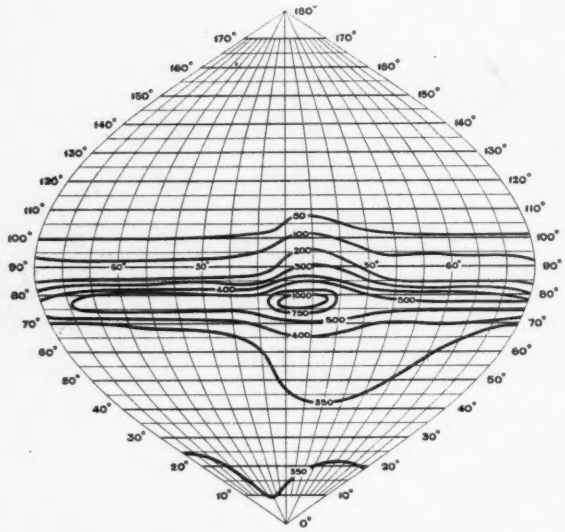
Above: Holophane new prismatic glass dome refractor.

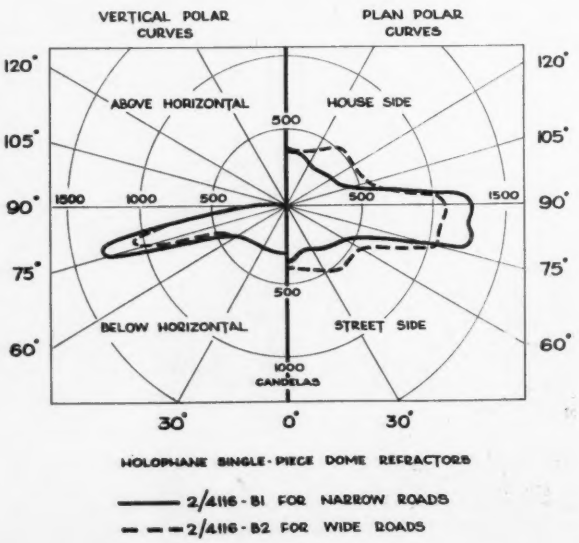
Top right: Iso-candela diagram of 2/4116-B1 *for narrow roads* (200-*watt G.L.S. lamp*).

Centre right: Iso-candela diagram of 2/4116-B2 *for broad roads* (200-*watt G.L.S. lamp*).

Bottom right: Comparative polar curves.





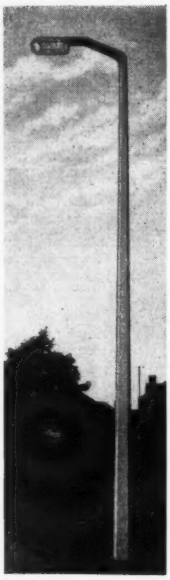


requirements of street lighting combined with a suitable degree of area lighting. A new bowl and two new dome refractors have now been produced to fit existing lanterns and to give a wider spread of light suitable for residential roads with wide grass verges and deep gardens which require lighting as well as the roadway itself. The new bowl refractor (2/4125 B) has the same overall and mounting dimensions as the non-axial 2/4125 and the symmetrical 4125 refractors. The concentration of light in the vertical is unchanged, but the new glass gives two broad fans of light along the road with a general all-round illumination. It is intended for all but the widest roads. The new dome refractors have the same overall and mounting dimensions as the single-piece dome series 4116. One has been designed for narrow and medium width and the other for wide Group "B" roads. In addition to the change in the spread of light a new type of prism is used which improves the distribution of light in angles below the main beam. These three new single-piece refractors are suitable for G.L.S. lamps up to 200 watts, for mercury and fluorescent bulb lamps of 80 and 125 watts and for blended lamps of 160 and 200 watts.

THE HORSTMANN GEAR CO., LTD., exhibited a comprehensive range of their automatic lighting appliances including hand and electrically wound models and synchronous models with and without spring reserve. One model is arranged to control two circuits so that some of the lamps controlled, as for example in multi-lamp fluorescent lanterns, can be extinguished at or about midnight.

THE NORTH MIDLANDS ENGINEERING CO., LTD., who specialise in street lighting installation, exhibited five new designs of steel and cast iron columns for Group "B" lighting. These columns are available galvanised or stove enamelled in any colour.

The main attraction on the stand of PHILIPS ELECTRICAL LTD., was the new 400-watt fluorescent bulb



Left: Revo Electric "Epic" column.

Above: Sangamo Weston-type SSC time switch.

lamp the excellent colour rendering qualities of which were demonstrated.

POLES LTD., showed three lighting columns of new design; (i) the "Adastra" universal column for 25 ft. mounting height and of sectional steel galvanised construction. The diameter at ground level is 7½ in. A flush fitting door permits access to the interior in which control gear, etc., can be housed; (ii) the "Alpha" column for Group "B" lighting; and (iii) the "Beta" column for Group "B" lighting which is similar in construction to (ii), but has a double taper providing a reduced diameter at ground level and therefore causes less obstruction of the footpath.

REVO ELECTRIC CO., LTD., showed a range of street lighting fittings for use with discharge and filament lamps for both Group "A" and Group "B" installations. The most recent additions to the range include the C.14407/8 (see p. 341) and the C.14446 vertical wall mounted unit (see p. 323). A recent fitting designed specially for use in the vicinity of aerodromes is the C.13194 (140-watt sodium) with aero screens. This is made of cast aluminium alloy and incorporates prismatic panels to provide medium angle non-cut-off distribution, but with the addition of aero screens to limit the upward light to conform with the M.O.T. specification. Other exhibits included a new version of the "Sol-Etern" lantern and the "Hatfield" lantern. In the outdoor display Revo showed eight street lighting columns.

The main feature of the SANGAMO WESTON LTD. stand was the type SS synchronous time switch some 25 variants of which were shown. One of the most popular types for street lighting control is the SSC with solar dial. Another model has two pairs of contacts so that some lamps in multiple lanterns can be extinguished whilst others remain alight.

SPUN CONCRETE LTD., showed a number of their Group "A" and Group "B" columns all of which are manufactured by the centrifugal spinning process. All columns have watertight compartments in the base for housing control gear.

STANTON IRONWORKS CO., LTD., showed five columns for Group "A" lighting and three columns for Group "B" lighting.

STEWARTS AND LLOYDS LTD. exhibited a selection of their standard tubular steel columns for Group "A" and Group "B" lighting. TUBEWRIGHTS LTD. (a subsidiary of Stewarts and Lloyds) exhibited a 40 ft. tubular steel flood-lighting tower carrying six floodlights and designed for the lighting of football grounds, arenas, etc. A platform and access ladder are provided for inspection and maintenance purposes.

THORN ELECTRICAL INDUSTRIES LTD. showed a range of their fluorescent and tungsten lamps including a new fluorescent tubular lamp designed to strike at low temperatures.

VAUXHALL MOTORS LTD. showed two types of three stage tower wagons mounted on Bedford trucks and a gas syphoning tank mounted on a 3-ton Bedford truck.

VENNER LTD. showed a range of their time switches. Four types of switch were mounted on a table which was subjected to continuous vibration; there was also a switch operating under water to demonstrate its resistance to moisture.

Personal

MR. PAUL REILLY, who has been chief information officer of the Council of Industrial Design since April, 1948, has been appointed deputy director in charge of the industrial division. His responsibilities will include the Council's relations with industry, its exhibition programmes, the promotion of "Design Review" (the Council's illustrated record of well-designed goods in current production) and of the record of designers, through which manufacturers in search of qualified designers are put in touch with suitable candidates.

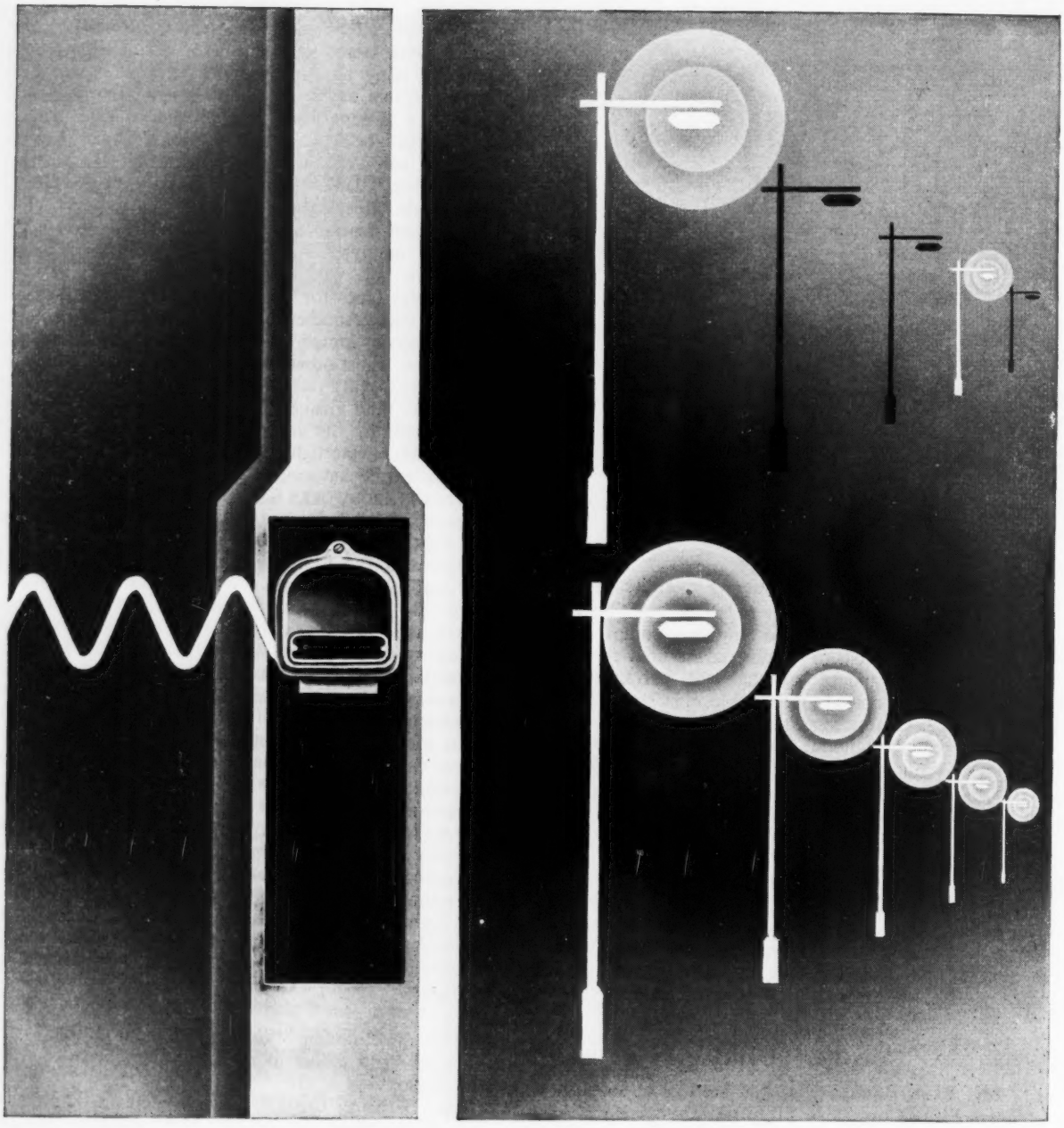
Mr. Reilly will be succeeded in the information division by MR. J. NOEL WHITE, who has for the past six years been information officer of the Rural Industries Bureau. His responsibilities will include public and Press relations, the approach to the retail trade and to educationists, and all publications, including the Council's magazine "Design."

MR. MORRIS BROWN, who was formerly on the editorial staff of the London "Evening Standard," has been appointed Press officer to the Council in place of MRS. M.-J. LANCASTER.

MR. G. E. L. COMRIE, district engineer, Holophane Limited, for Scotland and the North-Eastern England areas, has changed his headquarters to 39, Telford Road, Edinburgh 4, where all correspondence should now be addressed. His telephone remains unchanged at Edinburgh 77741. Mr. Comrie, who has been with Holophane for over 20 years, was honorary secretary, Edinburgh Centre of the Illuminating Engineering Society.

Thorn Electrical Industries Limited announce the appointment of MR. J. A. DUKE as a representative in the Scottish area of the Atlas lighting division. Mr. Duke has previously held appointments with Remington Rand, Ltd., and Thomas Ward and Co., Ltd., of Sheffield.

MR. W. J. BIRD has been appointed deputy sales manager of the G.E.C., Ltd.; this is in addition to his present responsibilities as sales manager of the London and Southern England area.



STREETS AHEAD

When planning a lighting network the engineer is naturally anxious to supply the community with the finest equipment available. A control system is part of the lighting plan and for the engineer who wants a system always under his personal control, without any worries about supply interruptions. " Rythmatic " ripple control offers the following advantages:—

★ The operation of the control switches is not interfered with by the temporary interruption of the electricity supply.
★ Centralized push-button control.
★ Multiple signals for all-night, half-night, prior-dawn switching.
★ Control switches fit most housings.
★ Control switches need virtually no maintenance.
★ For the services available " Rythmatic " is the most economical form of control.
★ Signals are available at any time, day or night.

RYTHMATIC RIPPLE CONTROL EQUIPMENT

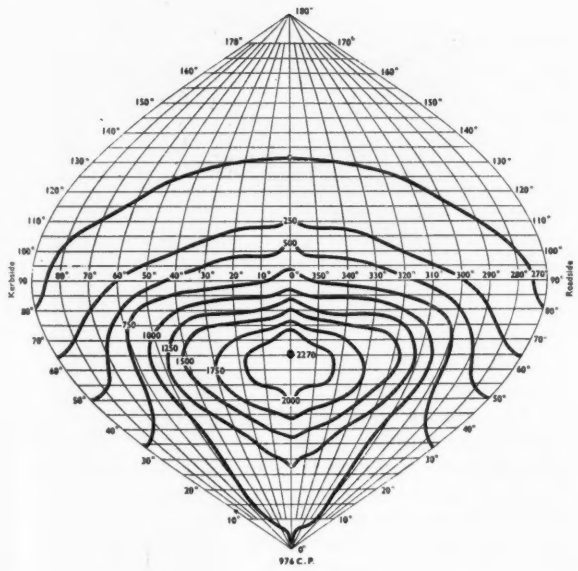
AUTOMATIC TELEPHONE & ELECTRIC COMPANY LIMITED
LONDON AND LIVERPOOL
AT2861-A

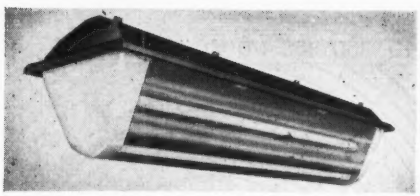
Street Lighting Lanterns

The following review includes street lighting lanterns introduced during the last two years; to review all lanterns now being produced would be too formidable a task. The information given on the following pages includes some details not previously published in any form and the review will therefore be a ready source of reference for street lighting engineers and public lighting authorities. It should be noted that though lanterns are classified under those intended for Group "A" or Group "B" lighting and are further sub-divided under types of light source used, some lanterns may be used with various types of lamp or for main road or secondary road lighting.

Fluorescent Lamp Lanterns for Group "A" Lighting

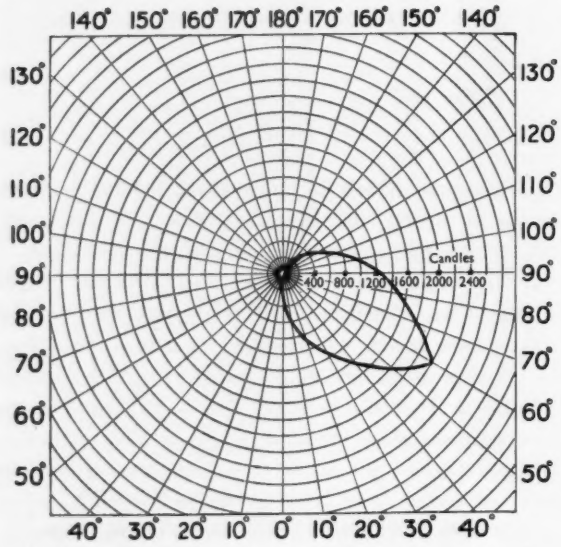
(1) B.T.H. 5-ft. 3-lamp



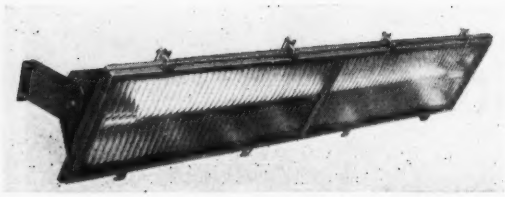


For use with three 80-watt 5-ft. fluorescent lamps. A number of important features include a corrosion-resistant aluminium canopy and a smooth one-piece "Perspex" cover bowl, free from drilling and riveting. An internal cantilever mounting makes tie-rods or braces unnecessary. Reflectors are of polished anodised aluminium. The unit is easily cleaned, and a rubber gasket ensures that the lantern is fully weatherproof and insect-proof. B.C. fixed lampholders are used and the auxiliary gear housed in the top of the lantern is readily accessible. There is also a two-lamp version.

(2) G.E.C. " Two-Eighty " Wall-mounted

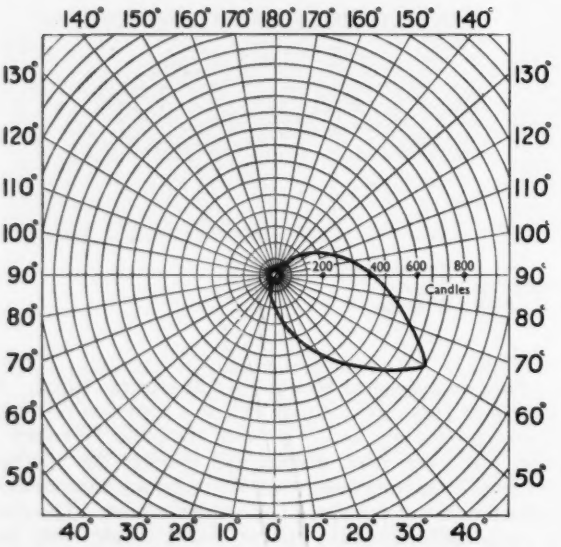


Light distribution in a vertical plane through maximum intensity for a two-lamp lantern.

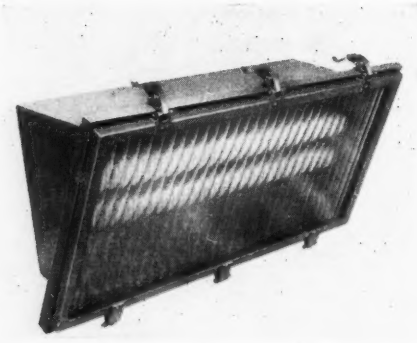


A lantern using two 5-ft. 80-watt fluorescent lamps; designed for wall-mounting at a height of 25 ft. and a spacing of 50-60 ft. The lantern can be rotated on its brackets to control the main beam. The lantern consists of an aluminium girder framework covered with aluminium sheet; a detachable tray within the body carries the auxiliary gear. It is totally enclosed by a hinged door, a rubber gasket between body and door ensuring a weatherproof seal when door is closed. The reflector is of polished anodised aluminium. A similar lantern housing only one 5-ft. 80-watt lamp is also available.

(3) G.E.C. " Two-Forty " Wall-mounted

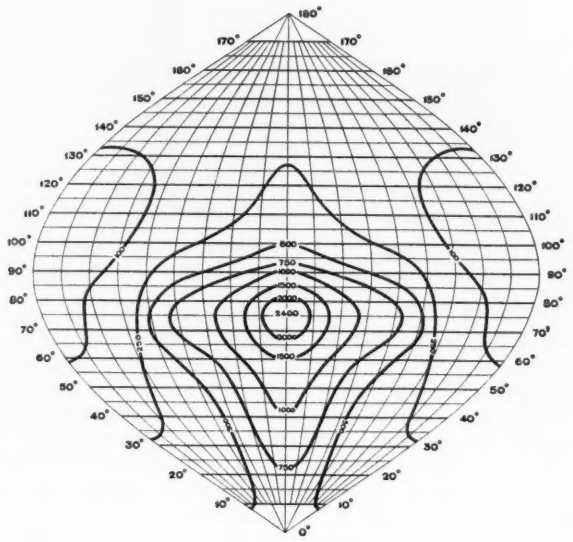


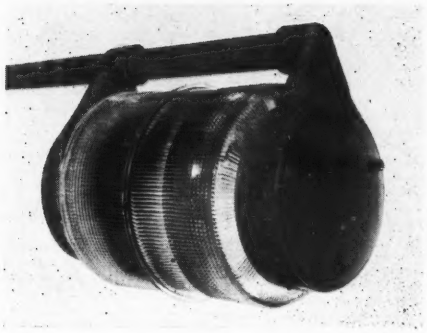
Light distribution in a vertical plane through maximum intensity for a two-lamp lantern.



This lantern uses two 2-ft. 40-watt fluorescent lamps, and may be used for Group " A " or Group " B " lighting. The direction of the main beam may be adjusted at the bracket; back brackets may be fitted to hook on to wall brackets so that the lantern can be removed from the wall for maintenance. The lantern body consists of an aluminium girder framework covered with aluminium sheet; auxiliary gear is carried on a detachable tray within the lantern. The reflector is of polished anodised aluminium. A rubber gasket provides a weatherproof seal between the hinged door and the body.

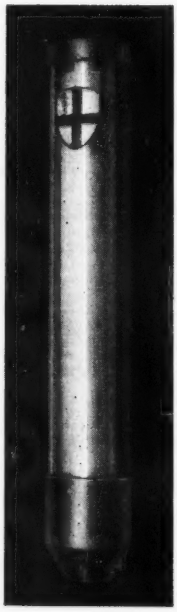
(4) Holophane Cylindrical



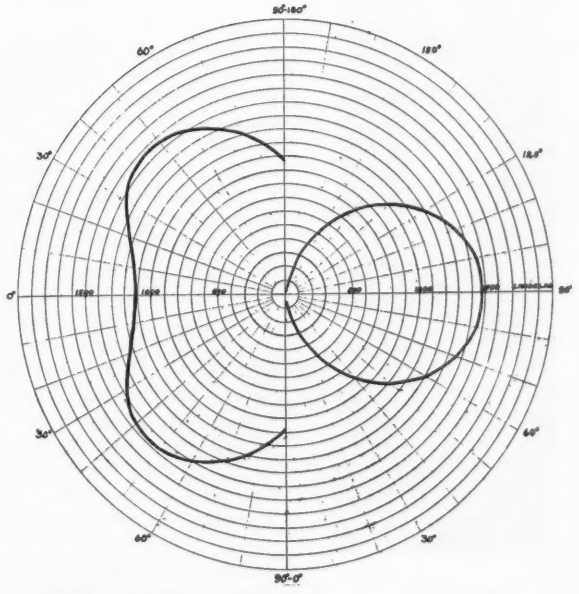


Designed for use with two 125-watt fluorescent lamps, type MBF, and provides a distribution of light which compares favourably with the performance of lanterns employing the 5-ft. 80-watt tubular lamps, type MCF. This development was made possible by the reduction in the bulb size of the 125-watt fluorescent bulb lamp; the lantern is of the minimum size to give effective light control.

(5) Revo Vertical Wall-mounted

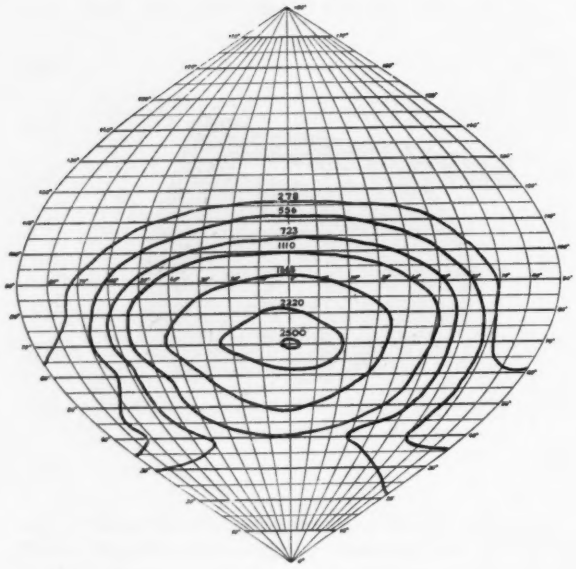


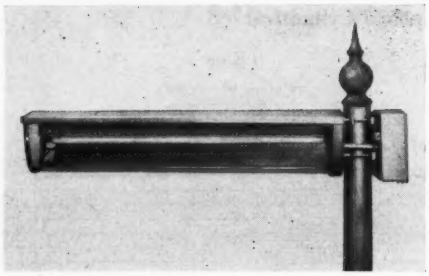
A vertical fluorescent unit for wall-mounting comprising a cast aluminium canopy and base with an enclosure of clear and reeded "Perspex." Designed for three 5-ft. 80-watt fluorescent lamps, with stainless steel reflector arranged to hinge forward for easy access to the control gear housed at the back, and space in the base of the fitting for a service cut-out and time switch or relay. The whole of the front is hinged and secured at one side by means of a sliding bolt from the bottom on the unit. The lantern is both functional and decorative when mounted on the walls of buildings adjacent to the roadway; most suitable for use in narrow thoroughfares.



Right-hand curve—distribution on vertical plane.
Left-hand curve—distribution on horizontal plane.

(6) Siemens " Capital "

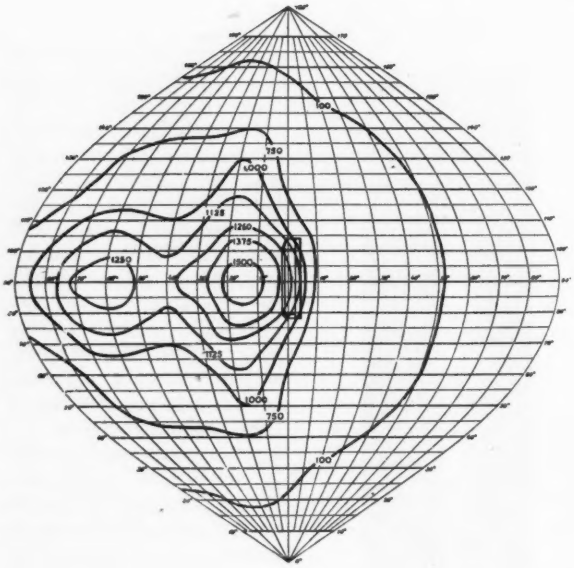




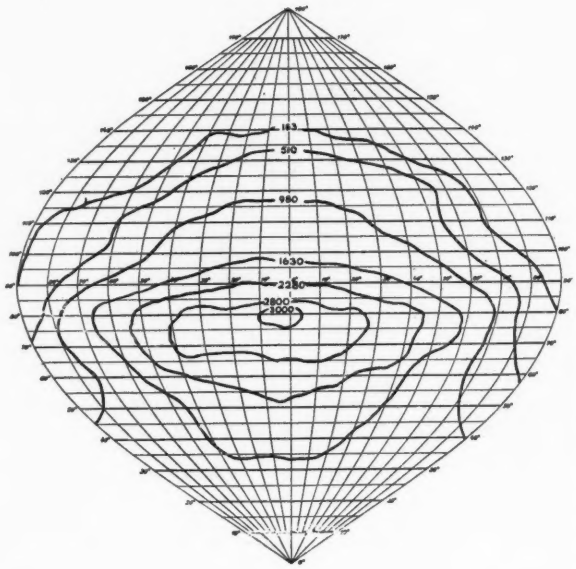
Designed to accommodate either two or three 5-ft. 80-watt fluorescent tubular lamps, or, in an alternative version, the same number of 4-ft. 40-watt lamps. Suitable for Group " A " or Group " B " lighting. A constructional feature is the method of mounting whereby the pole assumes the centre of gravity; a separate control gear box at the rear of the pole counter-balances the optical section, which is mounted on the front and ensures rigidity. It is suitable for direct mounting on existing trolley-bus overhead line poles. The optical section incorporates a roof of aluminium to which a cantilever bracket is fitted. Shaped to provide a sliding fit, eliminating hinges, clips or fixing screws, the " Perspex " bowl is retained in position by one castellated bolt. A weatherproof gasket ensures total enclosure.

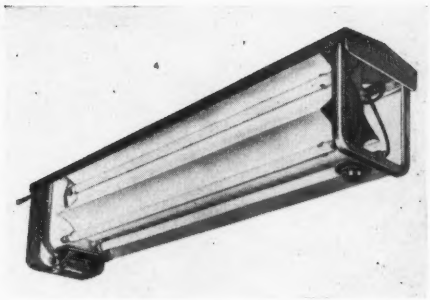
(7) Siemens " City "

Primarily a wall-mounting unit housing three 5-ft. 80-watt fluorescent tubular lamps, it can also be mounted on columns — either singly or in pairs back to back. Light control is by sealed-in prismatic refractors designed to provide adequate road brightness and illumination of pavements. The " Perspex " reeded cover is hinged to facilitate access to the accessories, and space at the foot of the fitting is provided for time switch, fuses, or relay. The control gear tray is removable to simplify erection of the shell. Total weight of the lantern, including control gear, is 96 lb. Mounting height should be about 25 feet.



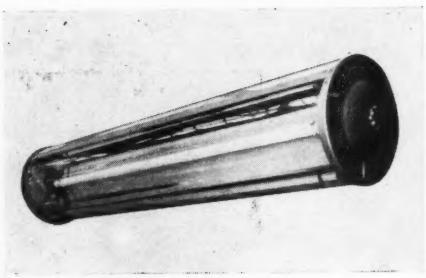
(8) Siemens " Chelmsford "





Designed for direct mounting on to the head of a steel or concrete column without the need for an external bracket. The lantern body consists of a cast aluminium-alloy end housing which is attached direct to the column head. This casting contains all the lamp control-gear and thus places the bulk of the total weight in close proximity to the central axis of the column. Equipped with four 5-ft. 80-watt fluorescent lamps. The light is controlled by four specially processed alloy reflectors to give a medium angle beam and broad axial distribution. Completely enclosed and waterproof, the clear " Perspex " cover is hinged at the column-mounting end, and is secured by means of a single hand-grip screw device.

(9) Siemens Sealed Cylindrical



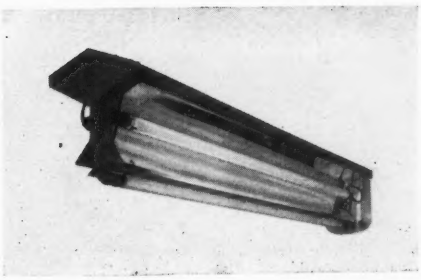
Using three 5-ft. 80-watt fluorescent tubular lamps, this cylindrical lantern is completely sealed against the ingress of insects and dust. Due to the cylindrical form, external self-cleaning under rainy conditions is practically automatic. The " bowl " is of clear " Perspex " and reflectors are of stove-lacquered " Birmabright." Though intended to be fixed at an angle of 90 deg. to the column, the lantern may be tilted where roads are tree-lined.

Light distribution is similar to that of three-lamp " Capital " lantern. (*See No.* 6.)

(10) Siemens " Clark "

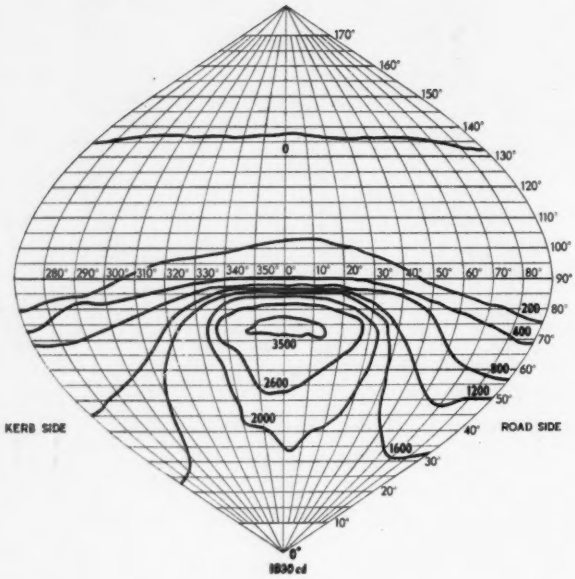
For application in locations where the climate is non-corrosive, the " Clark " open type of fluorescent lantern has been developed. Adaptable for two or three 5-ft. 80-watt fluorescent tubular lamps, the reflectors are of " Birmabright " stove lacquered.

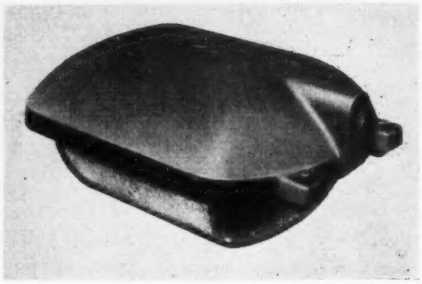
Light distribution is similar to that of three-lamp " Capital " lantern. (*See No.* 6.)



Mercury Lamp Lanterns for Group "A" Lighting

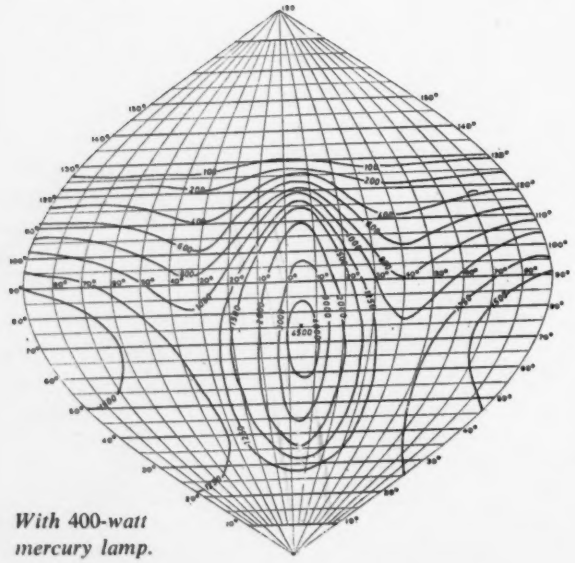
(11) B.T.H. "Sapphire"





Non-cut-off medium-angle beam type lantern for use with 250-watt mercury vapour lamps mounted horizontally. It is streamlined and corrosion-resistant. The ripple-glass diffusing cover-bowl reduces glare, and is designed to make the bowl self-cleaning in rain. The whole unit is totally enclosed and completely weatherproof. The two readily accessible bracket-locking bolts are themselves inside the lantern. The reflectors are of polished anodised aluminium. Auxiliary lamp gear is mounted separately either in a control box or in the column. The main body, bowl-ring and all other exposed metal parts are made from silicon-aluminium alloy.

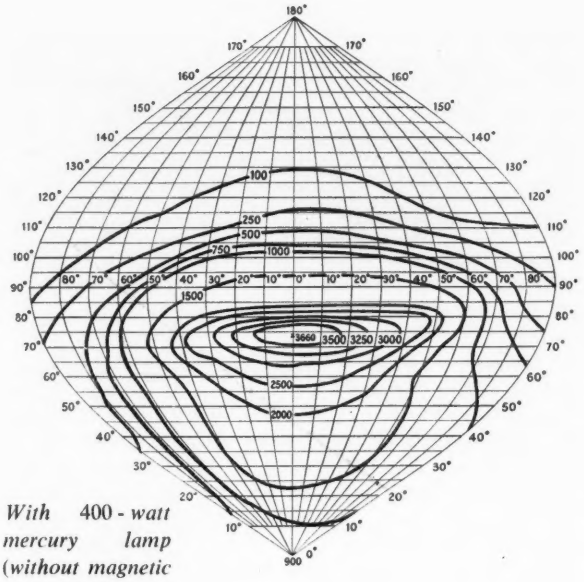
(12) Crompton "Leo"



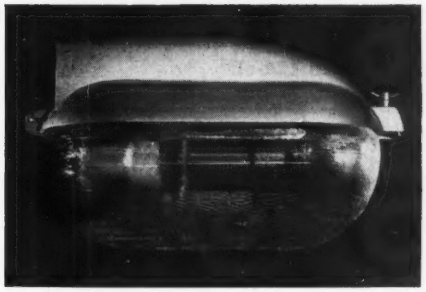
With 400-watt mercury lamp.

This lantern is for use with 250- or 400-watt mercury discharge lamps. The canopy is of silicon alloy, which is highly corrosion-resistant both in marine and industrial atmospheres. A heat-resistant prismatic glass bowl with a smooth exterior is provided for light control and is supplemented by an over-lamp reflector of vitreous enamelled steel. Hinges and toggle clips are of stainless steel. Gaskets are fitted for the exclusion of dust. Correct lamp positioning is ensured by the adjustment of the lampholder assembly to appropriately marked bosses.

(13) Metropolitan-Vickers "Trafford II"

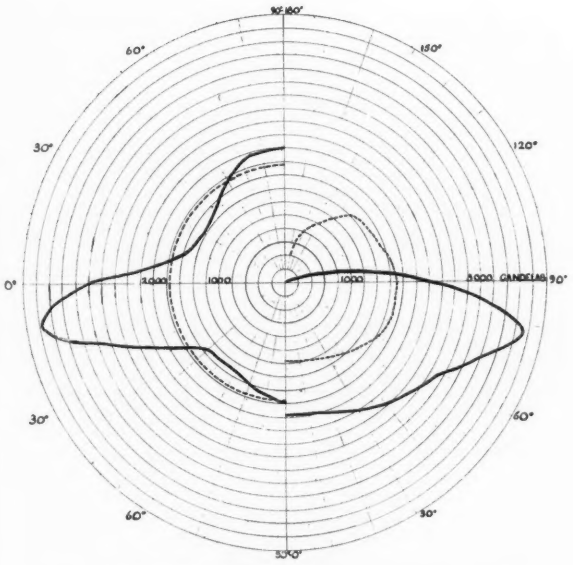


With 400-watt mercury lamp (without magnetic arc control).



An enclosed weatherproof lantern with top or side entry for mercury discharge lamps. The canopy is a one-piece silicon-aluminium alloy casting, which is highly resistant to corrosion, with space for a magnetic arc control device. The optical system consists of reflectors of super-purity aluminium electrolytically brightened and anodised, and a heat-resisting glass bowl of special finish, held in position by a cushioned ring, hinged at the bracket end and fastened with a swing bolt. Slight figuring of the bowl ensures smooth light distribution. The lantern is arranged to accommodate either a 400-watt MA/V mercury discharge lamp with magnetic arc control, or a 400-watt MA/U lamp, which does not require the magnetic arc-control device. A 250-watt MA lamp may also be used.

(14) Revo C.14114

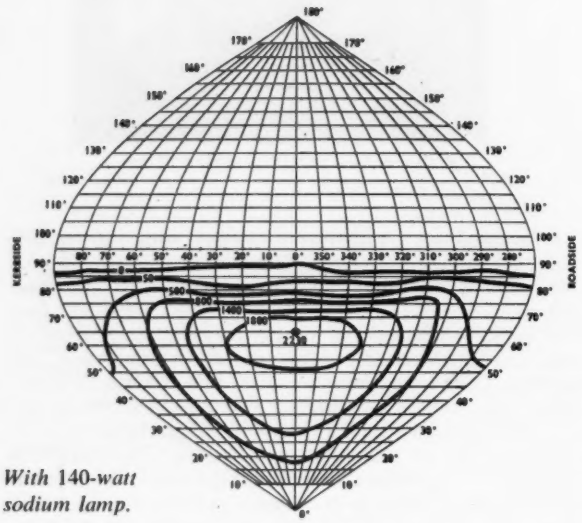


With 1,000-watt tungsten lamp. Dotted lines—lamp characteristics. Full line—distribution from lantern. Right-hand curve—distribution in vertical through maximum candle-power; left-hand curve—distribution at 79 deg. to downward vertical.

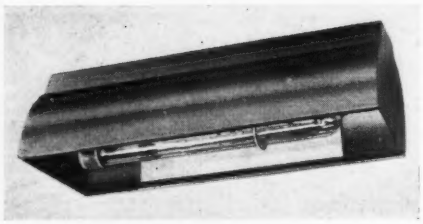
This unit comprises a cast aluminium canopy with inner vitreous enamelled reflector with acorn-shaped refractor bowl for 400-watt MAF/V lamp and with the addition of inner refracting ring when used with 750-1,000-watt tungsten lamps. The bowl is secured by means of a hinged cast aluminium ring with two quick-action toggle clamps. Designed for side-entry mounting.

Sodium Lamp Lanterns for Group "A" Lighting

(15) B.T.H. Open Cut-off

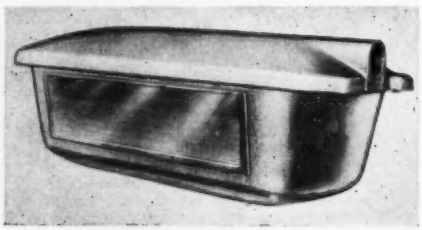


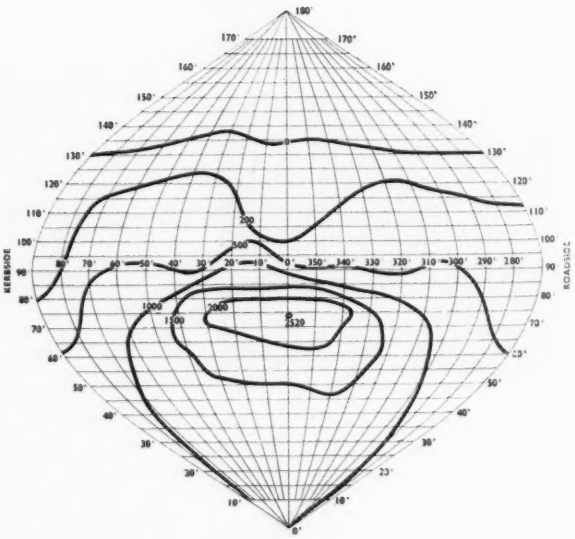
With 140-watt sodium lamp.



An open " cut-off " lantern using either 85- or 140-watt sodium vapour lamps. May be used with installations of " non-cut-off " sodium lanterns unobtrusively to increase the intensity of illumination over dangerous stretches of road. It may also be used on or near airfields, though it is not primarily intended for this purpose. Optical control is by two specially weatherproofed concave, mirrored glass reflectors mounted internally on either side of the canopy. A main beam is provided at 70 deg. with " cut-off " between 75 and 80 deg. from the vertical. The canopy of the lantern is made of bonderised sheet steel. An aluminium casting provides an anchorage for the lantern which is side-entry mounted on a bracket arm and secured by two internal locking bolts.

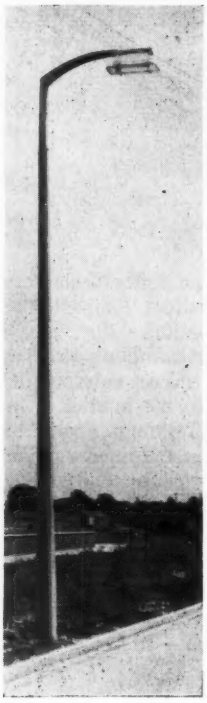
(16) B.T.H. " Amber "



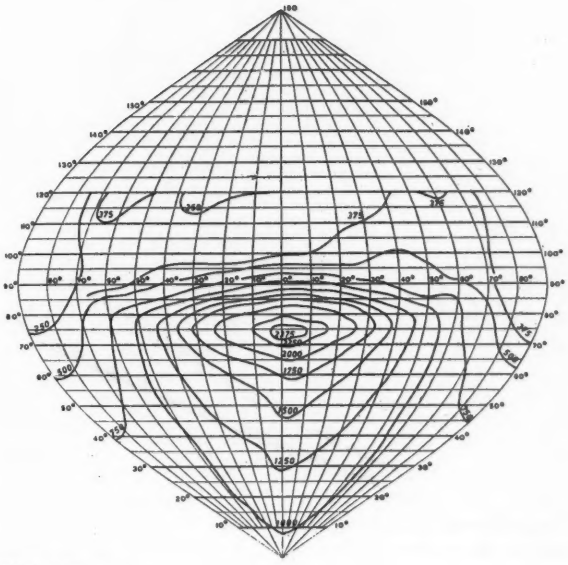


A streamlined side-entry sodium lantern principally for Group "A" lighting; it can be used with 140-watt or 85-watt sodium lamps and will house lamp control gear if required. Constructed of high-grade aluminium alloy and moulded " Perspex," it is totally weatherproof and has a smooth finish which is easy to keep clean. All external metal fittings are stainless steel. The optical system includes anodised aluminium reflectors and sealed refractor side panels. Light distribution is of the " non-cut-off medium angle beam " type, with a main beam at 75 deg. to the vertical.

(17) Crompton "Concept 2"

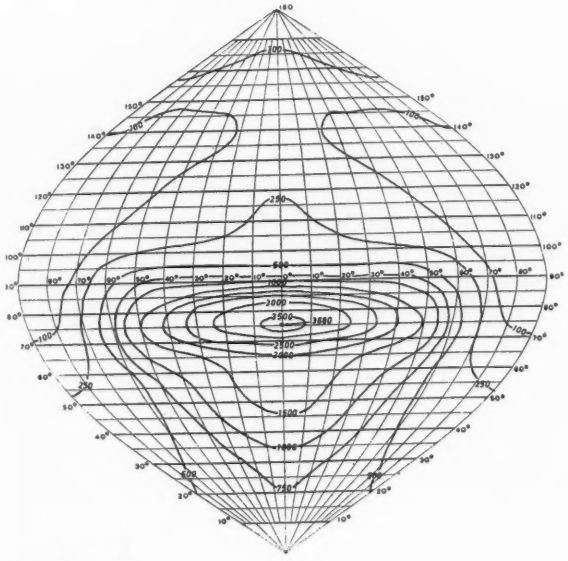


For use with 85- or 140-watt sodium lamps. It has been designed so that lantern and column are integrated as a complete unit. Light control is by means of "Perspex" prismatic plates sealed to the inside of an open "Perspex" bowl. This bowl is attached to a concrete head developed from the concrete bracket arm so that there is no exposed metal other than the holder and lamp supports within the bowl. Maintenance is reduced to the replacement of lamps and occasional wiping of the "Perspex" bowl which is self-cleaning under the action of rain. The bowl assembly can be supplied for use with Stanton 8D or 8F pre-stressed concrete columns or Concrete Utilities 3D, 3DN or 3DNN columns.

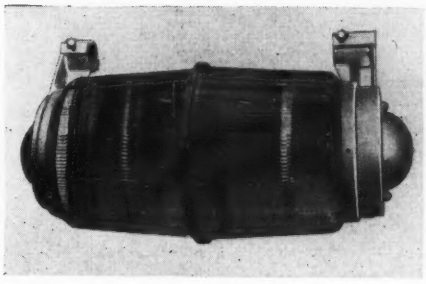


With 140-watt sodium lamp.

(18) Crompton "Aries"

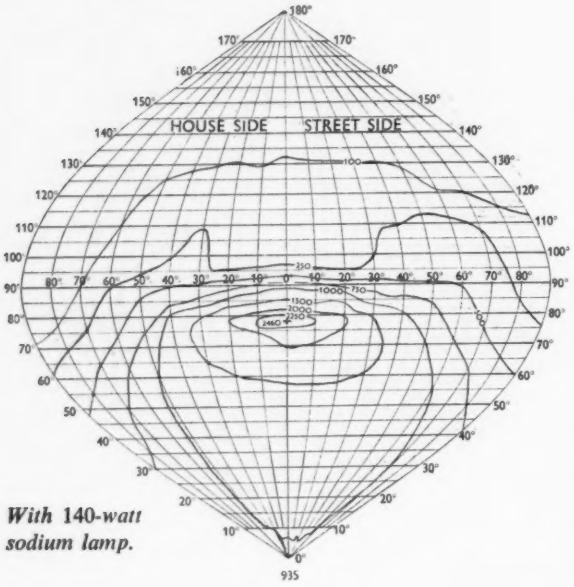


With 140-watt sodium lamp.

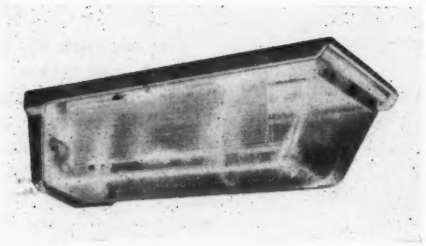


This lantern uses 85-watt or 140-watt sodium lamps. Light control is by means of a cylindrical glass refractor unit held between cast end-plates with extension arms for suspension from a horizontal bracket tube. The prism formation in conjunction with an internal reflector ensures light control through 360 deg. and high efficiency whilst the dispersion of light over so large a refractor area ensures low source brightness. Rotation of the refractor unit between the end-plates allows adjustment of the angle of elevation of the main beams with respect to road gradients, for which purpose a calibrated scale is provided. Corrosion-resistant materials or materials well protected against corrosion are used throughout the lantern construction. Gaskets are fitted for the exclusion of dust.

(19) Ediswan " Type SSA/1 "

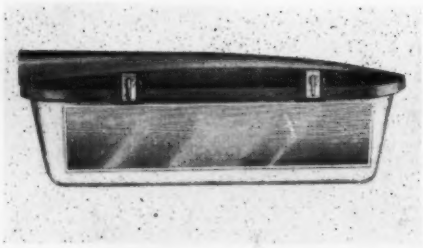


With 140-*watt sodium lamp.*



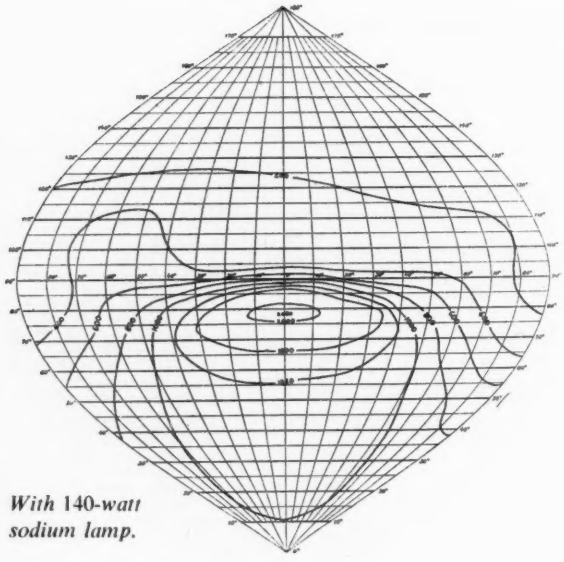
A totally enclosed side entry plate refractor lantern for use with 85-watt or 140-watt sodium lamps. The lantern body is cast in silicon-aluminium alloy, which has a high resistance to corrosion and combines strength and durability with lightness. All screws entering the body are of stainless steel. Access to the interior is by unfastening a knurled screw and sliding open the " Perspex " bowl. The bowl slides in felt-lined runners and in all positions is firmly supported by two sliding rods. The lantern is completely waterproof when closed. Precision cut " Perspex " refractor plates are sealed to the interior of the bowl. Metal work is finished in aluminium paint on the exterior and in white in the interior.

(20) Falk, Stadelmann " Fulmar V "



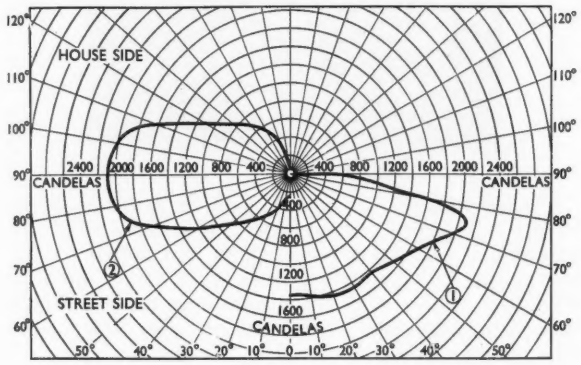
A non-cut-off, enclosed type, side-entry lantern for use with 85-watt or 140-watt sodium discharge lamps. The hood is of cast aluminium alloy treated by the " Alocrom " process, primed and stove enamelled grey outside and white inside. The " Perspex " enclosing bowl carries two machined " Perspex " refractor plates which are hermetically sealed into the interior of the bowl. Sealed against ingress of water or dust by means of a resilient rubber gasket and four stainless steel spring clips. All accessories are either of stainless steel or " Duralumin."

When the lantern is required for top entry it is designated as the " Fulmar VII "; an interior stove enamelled sheet aluminium interior reflector is added to conceal the wiring and facilitate cleaning.



With 140-*watt sodium lamp.*

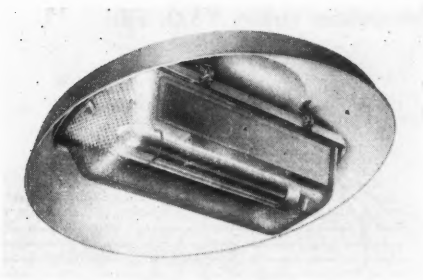
(21) G.E.C. Z.9401



Curve is of lantern using 140-*watt lamp.*

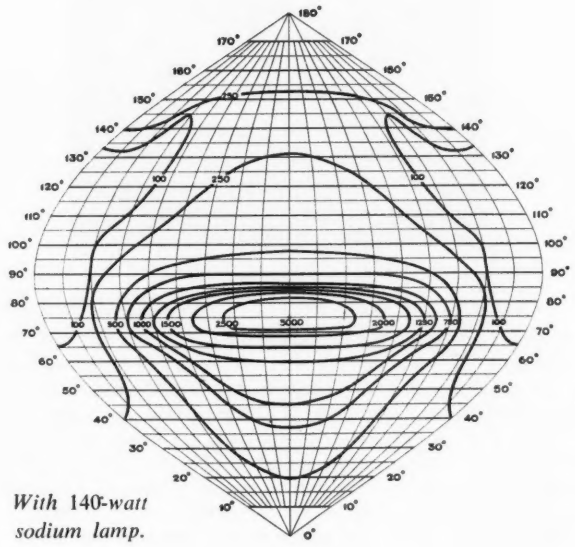
(1) *Light distribution in vertical plane through maximum intensity.*

(2) *Light distribution around the lantern at an angle of* 75 *deg. to the downward vertical.*

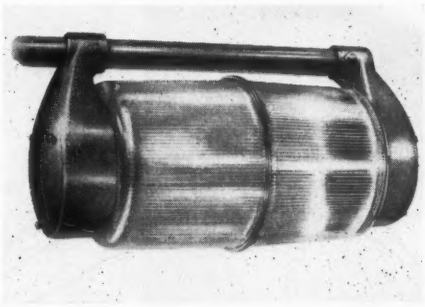


A top entry lantern using 85-watt or 140-watt sodium lamps and giving a medium angle beam distribution. The lantern is especially designed to meet the specification issued by the Ministry of Transport for lanterns to be used in the vicinity of airfields. The intensity at and above the horizontal is limited by a screen. An average spacing of 130 ft. is recommended. The body is a one-piece light alloy die casting. Light control is provided by "Perspex" refractor plates cemented one to each side of an unplasticised "Perspex" bowl. The method of fixing leaves the joint completely transparent and provides a smooth interior and exterior surface for ease of cleaning. A non-porous special rubber gasket between the body casting and bowl ensures a weatherproof seal when the lantern is closed.

(22) Holophane Cylindrical

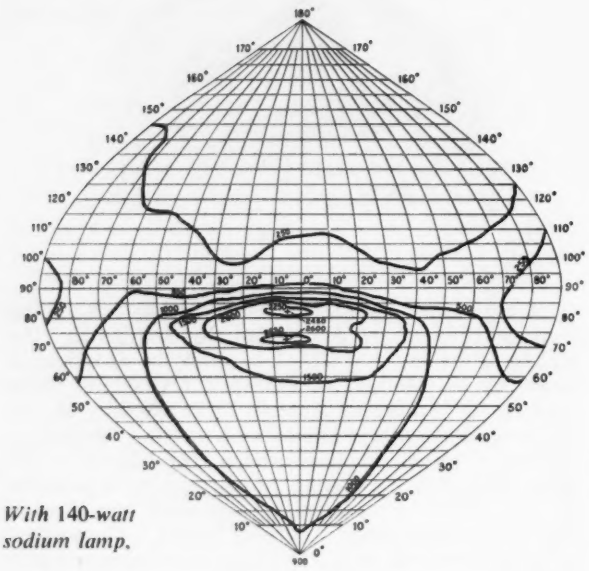


With 140-*watt sodium lamp.*

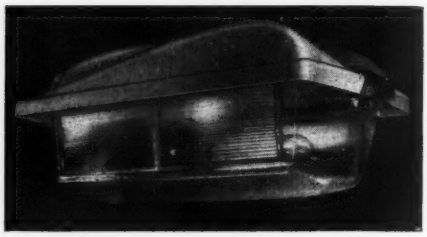


A side entry lantern for use with 85-watt or 140-watt sodium lamps. Two silicon-aluminium alloy end castings are bolted to end plates holding the refractor glasses together. Cover plates in the end castings provide access for relamping; the removal of both plates enables the refractor glasses to be rotated for adjustment of the beam. A gradient scale is provided to ensure correct adjustment of beam angle for any given gradient. The refractor comprises two sealed smooth exterior prismatic bowls giving a medium angle beam. The light emission is controlled throughout the vertical circumference of 360 deg., the whole of the glass area being fully flashed. A small white baffle mounted over the lamp equalises the temperature distribution.

(23) Metropolitan-Vickers "S.O. Fifty"



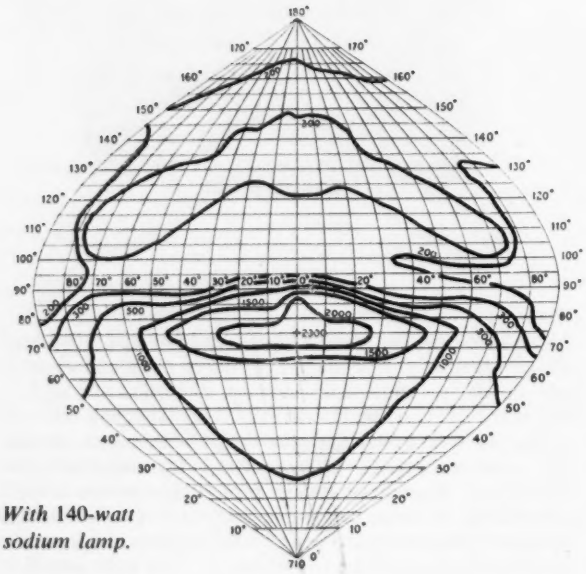
With 140-watt sodium lamp.



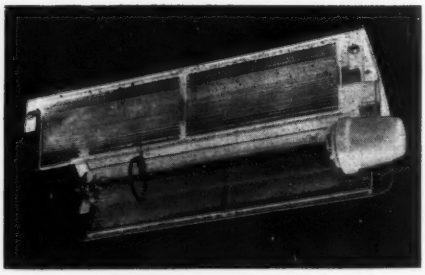
An all-enclosed lantern for side or top entry using 85-watt or 140-watt sodium lamps. It is easily wired and erected and requires a minimum of maintenance. The new version has the auxiliary gear in the canopy and has been designed to meet installation requirements where there is no provision for housing auxiliary gear in the base of the column.

The canopy is shaped from 3-16-in.-thick dense opal "Perspex"; it is attached to a cast metal rib of aluminium alloy which forms the attachment for the lantern to the column and also carries the lampholder and lamp support assemblies. The bowl, made from clear "Perspex," hinges from the rib by a wire fastening in a metal toggle. When it is closed the lantern is completely weatherproof. The refractors are made to very fine limits from clear "Perspex" blanks which are afterwards sealed to the inside of the clear bowl.

(24) Metropolitan-Vickers "S.O. Fifty-two"

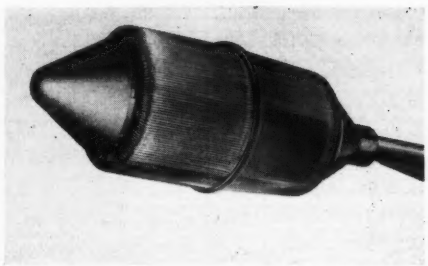


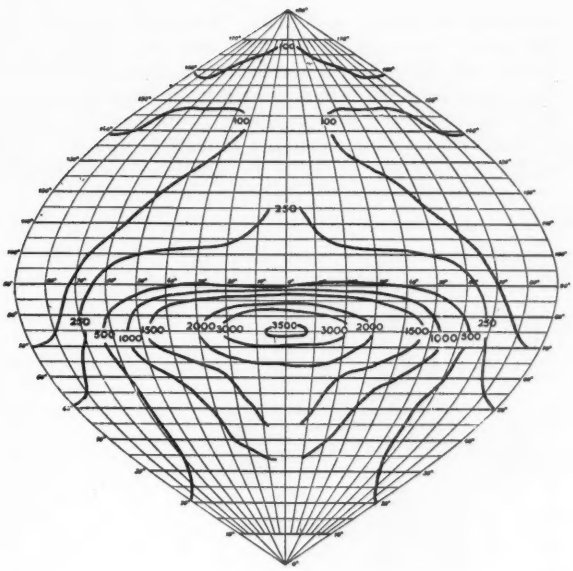
With 140-watt sodium lamp.



An open-type lantern for use with 85-watt or 140-watt sodium discharge lamps for Group "A" and Group "B" lighting. The lantern consists essentially of a plastic hood and a cantilever casting which supports the entire lantern on the bracket. The hood is formed from $\frac{1}{8}$-in.-thick clear "Perspex" with the top opalised to form a diffusing reflector. Heavy gauge metal straps are used to attach the hood to the casting and to maintain correct alignment of the optical system. The cantilever casting is made of aluminium alloy. In addition to carrying the hood it also carries the supports for the lampholder and the lamp, and in the case of the side entry lantern, is drilled to receive the bracket arm tube to which the lantern is held by two steel set screws. The refractors are specially designed and made to very fine limits from clear "Perspex" blanks which are afterwards hermetically sealed to the inside of the clear plastic hood.

(25) Siemens "Bracknell"

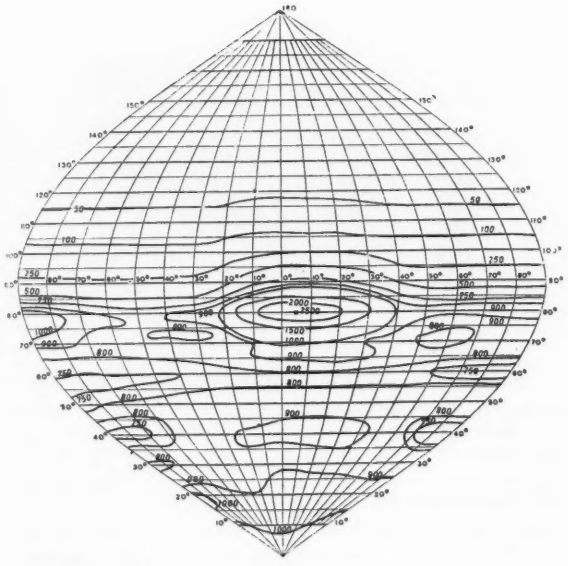




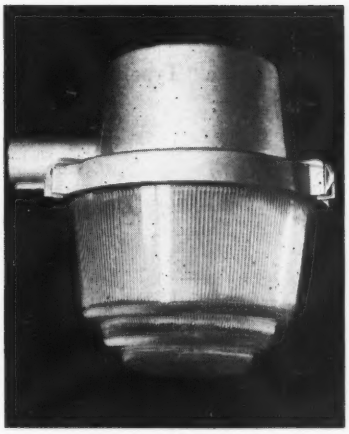
A completely sealed side entry lantern designed for use with a 140-watt sodium lamp. Its main features include a hermetically sealed refractor assembly and provision for adjustment to cater for road gradients. Light distribution is controlled by refractors used in conjunction with a small vitreous enamelled reflector above the lamp. The glassware has a smooth cylindrical exterior which renders maintenance extremely simple; to a large extent the lantern is "self-cleaning."

Tungsten Lamp Lanterns for Group "A" Lighting

(26) Crompton "Lion"



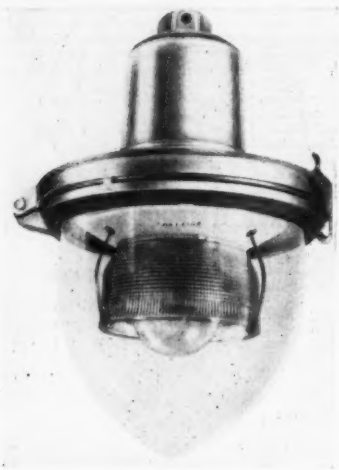
With 500-watt tungsten lamp.

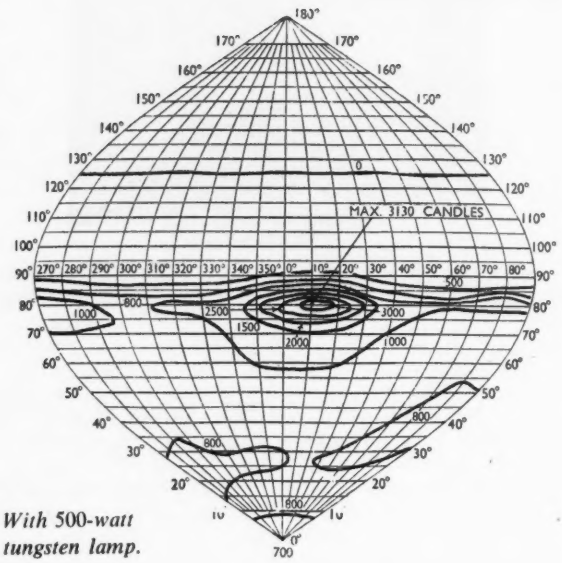


This lantern can be fitted with 300-watt or 500-watt tungsten filament lamps. It has a canopy cast from silicon aluminium alloy which has excellent corrosion resistance in marine and industrial atmospheres, and is finished with stoved aluminium paint. Light control is achieved by means of an internal dome refractor and the outer bowl reflector, both of which are of crystal glass. An over lamp reflector of vitreous enamel steel ensures high light output. Hinges and toggle clips are of stainless steel. Gaskets are fitted for the exclusion of dust.

(27) G.E.C. " Wembley "

Suitable for 300-watt or 500-watt tungsten lamps; available for top or side entry. The body consists of a bell-shaped iron casting. A cast iron ring hinged to the lantern and secured by a non-ferrous toggle catch supports the outer glassware, which is held in the ring by stainless steel spring clips. Two synthetic rubber gaskets ensure a weatherproof seal when the lantern is closed. The optical system consists of a single-piece prismatic glass dome refractor. The lantern is also available to take a 250-watt mercury lamp, and in this form has a single-piece heat-resisting glass bowl refractor with curved prisms on its interior surface. Alternatively a stepped opal globe is available, this form being purely diffusive.

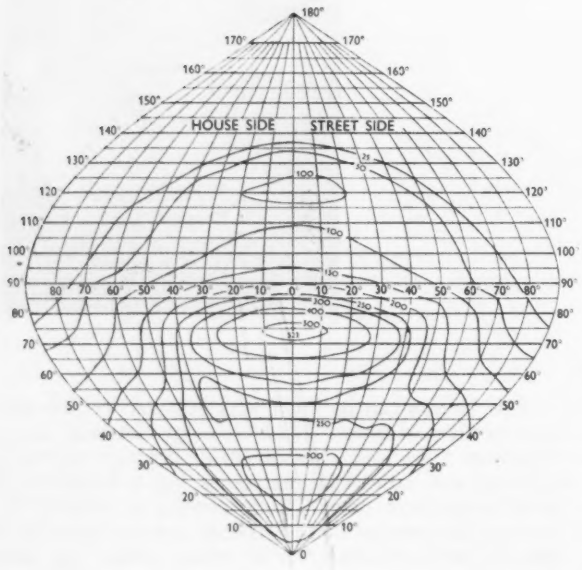


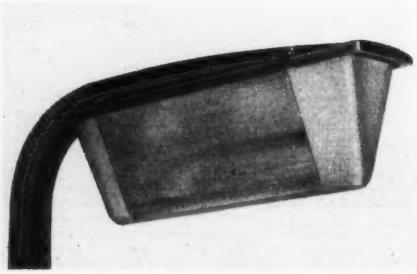


With 500-watt tungsten lamp.

Fluorescent Lamp Lanterns for Group " B " Lighting

(28) Ediswan " Type BS 240 "

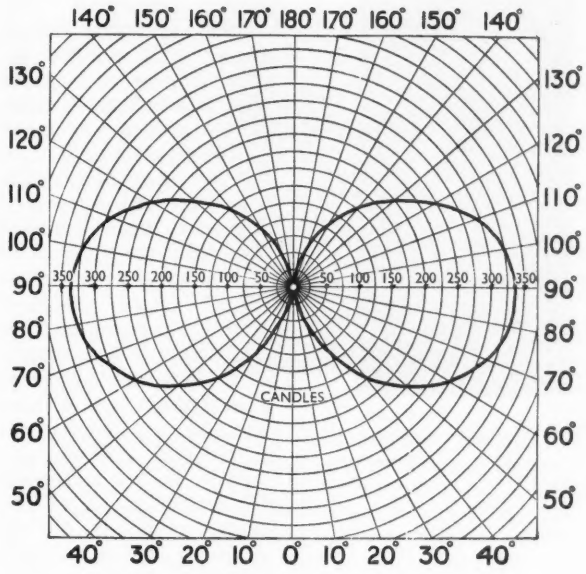




A totally enclosed side entry plate refractor lantern using 2 ft. 40-watt fluorescent lamps. Suitable for mounting with an inclination between 0 deg. and 15 deg. above the horizontal in a plane across the road. The body is cast in corrosion resisting silicon aluminium alloy. Control gear and lampholders are mounted directly to a gear tray which also acts as a reflector. The reflector with gear can be removed as a complete unit. The " Perspex " bowl, clear except for the ends which are opal, is hinged to the body by a stainless steel support and secured by quick release toggle catches. Light distribution is controlled by machine cut " Perspex " refractor plates sealed to the inside of the bowl.

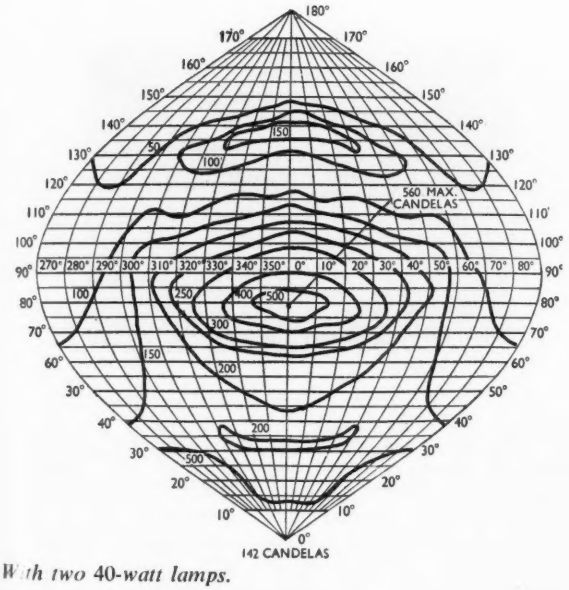
(29) G.E.C. "Four-Forty"

Suitable for four 2-ft. 20-watt or 40-watt fluorescent lamps; recommended mounting height of 13 to 15 ft. at a spacing of 80 to 100 ft. The lantern is a "Perspex" cylinder, through which runs a central metal tube carrying two cast end plates; the lower plate carries four bi-pin lampholders and starter sockets—the upper plate is also fitted with four lampholders. The lampholders are spring-loaded and retractable. The bottom opal "Perspex" dish and aluminium spigot cap are screwed on to the centre tube. Over this assembly the "Perspex" cylinder fits, resting on the lower dish. The top dish, which is also of opal "Perspex," is secured by a cast knob which, when screwed down, makes the lantern totally enclosed and weatherproof. The gear must be housed outside the lantern.

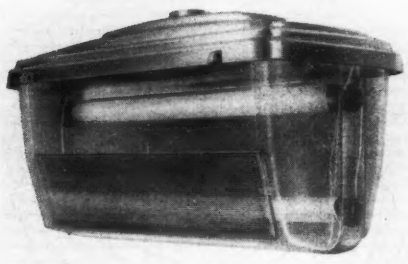


With four 40-watt lamps. Light distribution in vertical plane through maximum intensity.

(30) G.E.C. "Two-Forty"

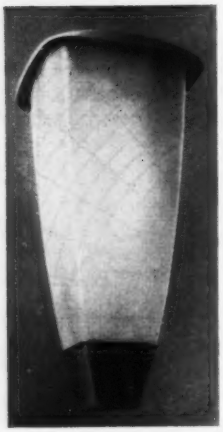


With two 40-watt lamps.



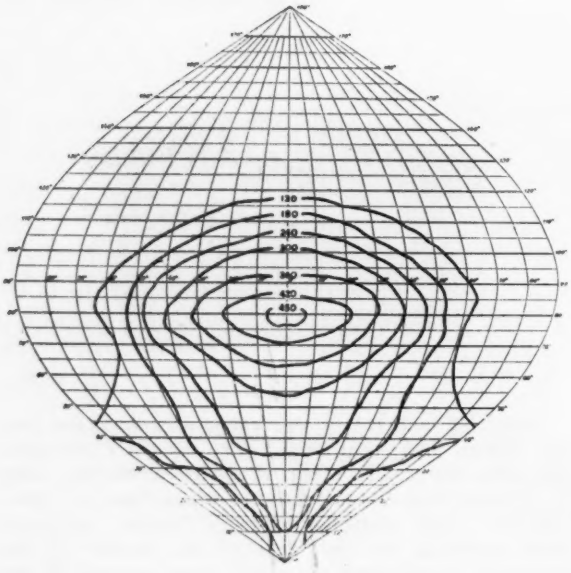
Available with top or side entry; accommodates two 2-ft. 40-watt fluorescent lamps. The body is a one-piece light alloy die-casting. Gear is carried within the body on a hinged tray, the underside of which forms an over-reflector. Light control is by two "Perspex" refractor plates cemented to each side of the interior of the "Perspex" bowl; both inner and outer surfaces of the refractors are smooth. Lampholders are mounted directly to the inner surface of the bowl. The bowl is easily removed and a rubber gasket between the bowl and the body casting ensures a weatherproof seal.

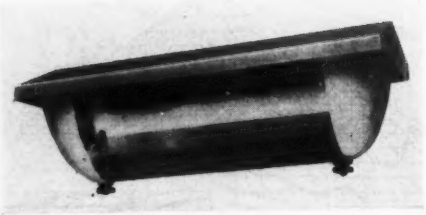
(31) Siemens " Cathay "



This post-top lantern has been designed to give effective lighting combined with pleasing appearance. In addition to normal street lighting it is suitable for space lighting and promenade and balustrade lighting. The lantern is arranged to accommodate either two or four 2-ft. fluorescent lamps in a vertical position. Fabricated from diffusing " Perspex " the outer bowl is surmounted by a roof of white " Perspex " which is sealed to the bowl; the complete assembly fits securely to the alloy base by means of a durable gasket, thus rendering the lantern interior wholly enclosed and immune to dust and moisture. Designed to be secured to a 3-in. x 3-in. spigot. A mounting height of 15 ft. to the centre of the light source is recommended.

(32) Siemens " Cheltenham "

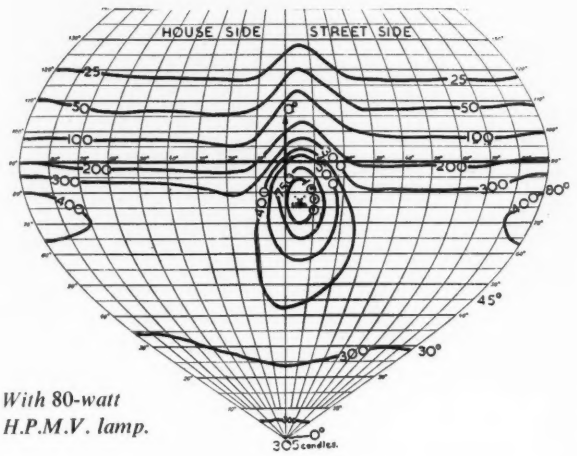




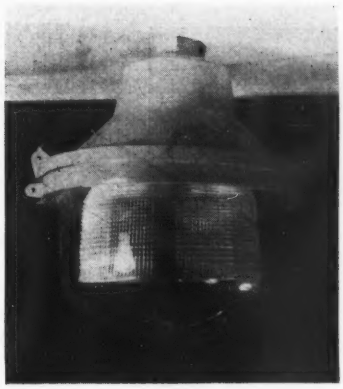
Designed for side entry mounting on a 1 in. plain gas barrel by means of a split-ring locking device. Equipped with two 2 ft. fluorescent tubular lamps, the lantern body is of cast alloy construction. Reflectors are of pure aluminium, finished by a special process; the " Perspex " bowl is held in position by two large castellated nuts of non-ferrous metal. To render the lantern dirt and insect proof, an asbestos gasket is fitted between the bowl and the body of the lantern. Lamp control gear is mounted inside the top canopy.

Mercury Lamp Lanterns for Group "B" Lighting

(33) Falk, Stadelmann "Wellesley"



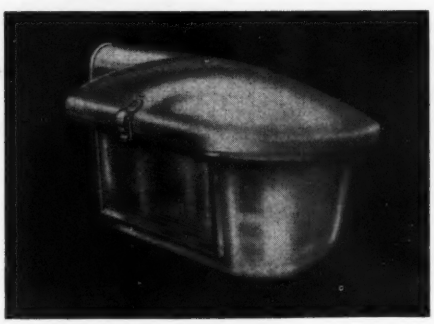
With 80-watt H.P.M.V. lamp.



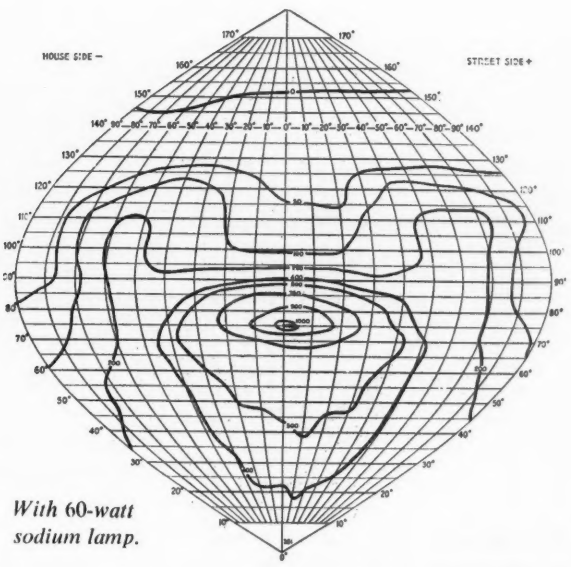
A non-cut-off, enclosed type, top entry lantern for use with 100-watt or 200-watt tungsten lamps or 80-watt or 125-watt H.P.M.V. lamps. The lantern hood is of die cast aluminium alloy treated by the "Alocrom" process, primed and stove enamelled grey outside and white inside. The interior white vitreous enamelled sheet steel reflector has supports for a Holophane single piece dome type refractor. The lantern is sealed against ingress of water or dust by means of two rubber gaskets and two stainless steel spring clips.

Sodium Lamp Lanterns for Group "B" Lighting

(34) Wardle "Stuart"



This lantern is for use with 45-watt or 60-watt sodium lamps and gives a medium angle beam. Twin refractor plates, with highly efficient machine-cut prisms, are cemented to a suitably shaped "Perspex" bowl to form the optical system : dirt is excluded from the prisms and all surfaces are smooth. The body and the bowl frame are of corrosion-resistant aluminium alloy "pyluminised" before being stove enamelled—white inside, aluminium outside. Maintenance is minimised by the choice of stainless steel or aluminium alloy for small metallic parts to avoid electrolytic corrosion, and by fitting effective gaskets to exclude dirt and moisture. Top or side entry lanterns

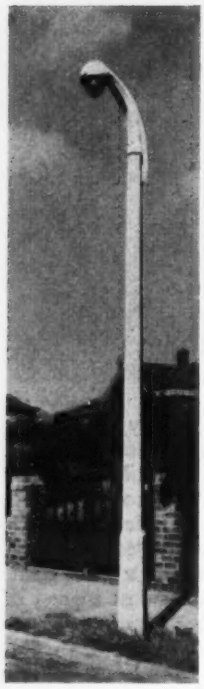


With 60-watt sodium lamp.

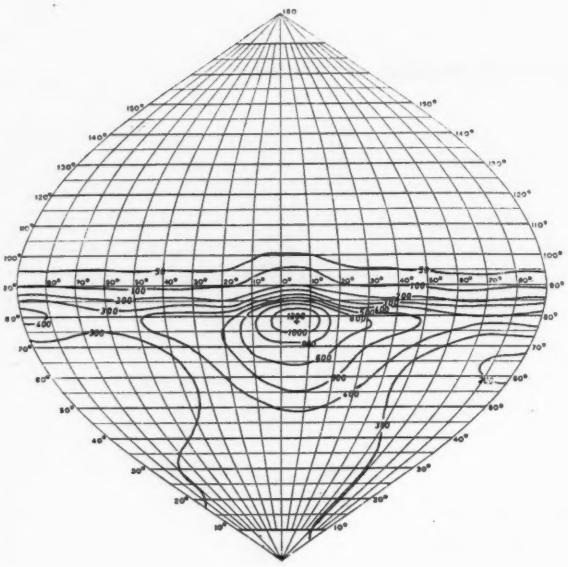
are available. A flat stove enamelled aluminium internal reflector can be supplied if required; alternatively the control gear, together with a masking reflector, can be housed in the interior.

Tungsten Lamp Lanterns for Group "B" Lighting

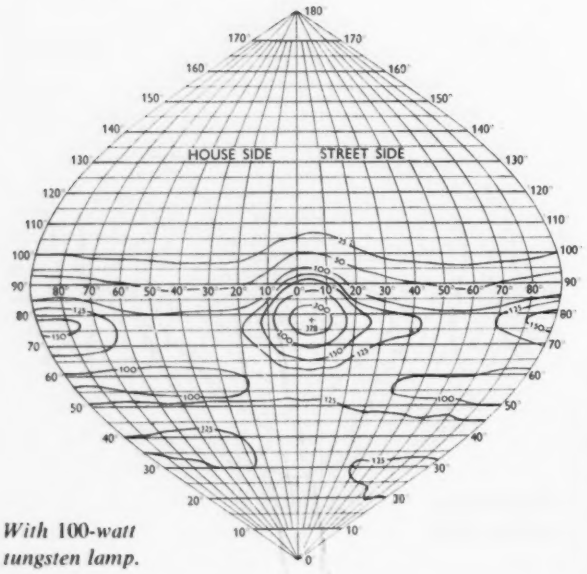
(35) Crompton "Concept I"



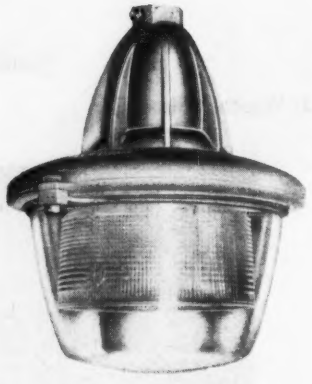
This lantern was designed in conjunction with the concrete columns with which it is intended to be used. Lamps may be 100-watt or 200-watt tungsten or 80-watt or 125-watt mercury discharge with height to light source of 15 ft. The prismatic glass bowl is built in to the end of the concrete bracket which replaces the hood of the orthodox lantern. The only exposed metalwork is a narrow ring, between glass and concrete, cast from an aluminium alloy that is highly resistant to corrosion. Maintenance is reduced to the replacement of lamps and the occasional cleaning of the glassware. Several versions of the Concept I are available with columns manufactured by Concrete Utilities Limited.



(36) Ediswan "Type BT 22"

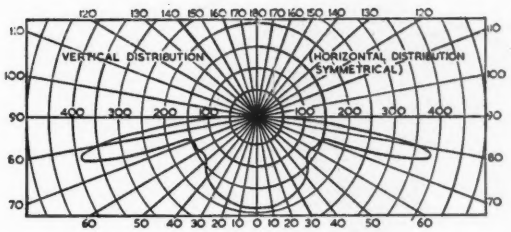


With 100-watt tungsten lamp.



A totally enclosed top entry lantern for use with 60-watt to 200-watt tungsten lamps or 80-watt or 125-watt mercury lamps. The lantern body and reflector is a single piece die casting of silicon-aluminium alloy with a high resistance to corrosion; the bowl retaining ring and all screws entering the body are of stainless steel. Alternative pre-set positions to suit varying lamp sizes are provided. The internal glass dome refractor is easily positioned in relation to the body casting. Three forms of light distribution are available : two-way non-axial; two way axial and symmetrical. The enclosing bowl is normally of clear glass; a clear "Perspex" bowl is available for use with lamps up to 100-watt.

(37) " Eleco " " Universal 100 "

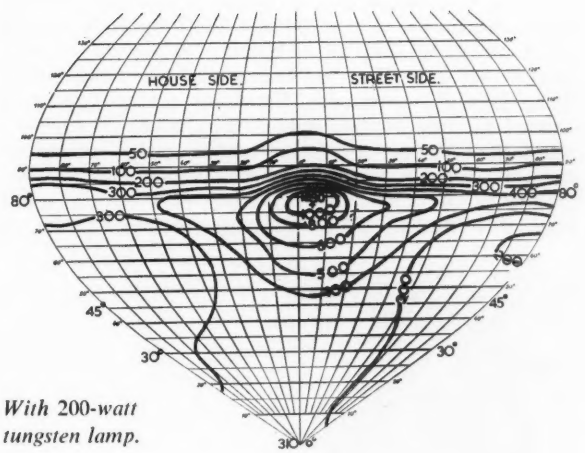


With 100-*watt tungsten lamp.*

This lantern consists of a die-cast aluminium alloy body, refractor retaining ring, lampholder and " Perspex " refractor. The refractor and retaining ring can be quickly released from the top casting by means of three key-slotted holes. The refractor prisms are machined on the inside of the " Perspex " cylinder. Open and enclosed types are available, in the latter the bottom of the refractor tube being sealed with plain " Perspex." The lantern is designed primarily for use with 100-watt tungsten lamps, but the open type may also be used with 80-watt mercury lamps.

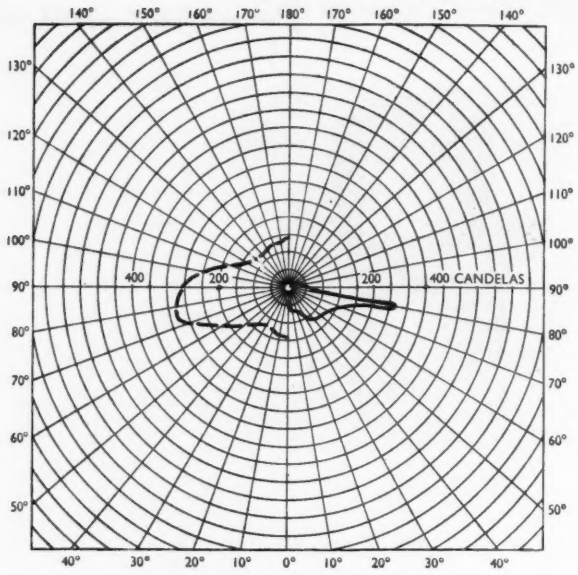
(38) Falk, Stadelmann " Dragonfly "

An enclosed type top entry lantern for use with 100-watt or 200-watt tungsten lamps or 80-watt or 125-watt mercury lamps. The lantern hood is of die-cast aluminium alloy treated by the " Alocrom " process. The single piece Holophane bowl refractor gives a non-axial distribution. An inner white vitreous enamelled sheet steel reflector is incorporated.



With 200-*watt tungsten lamp.*

(39) G.E.C. Post-top

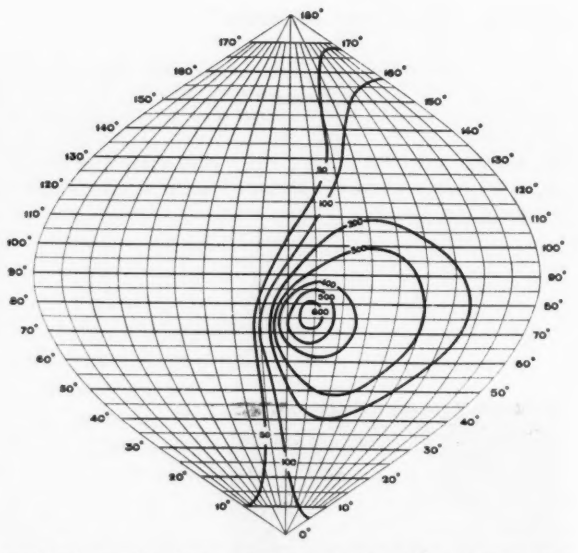


With 100-*watt tungsten lamp.*
—— *Vertical plane through maximum intensity.*
- - - - *Light distribution over a cone through maximum intensity.*

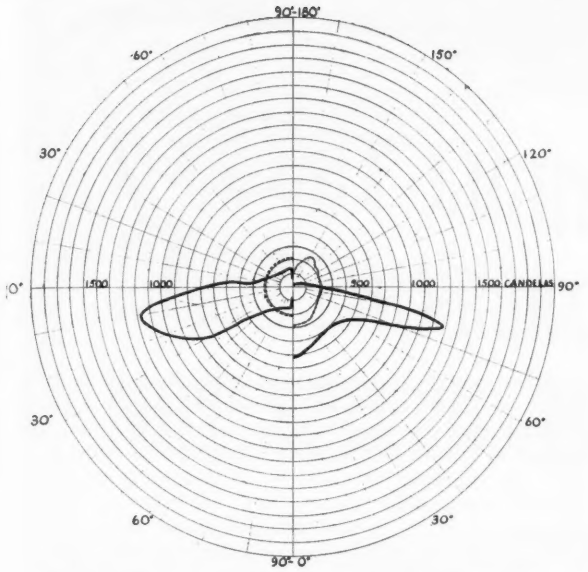
This lantern gives best results at a mounting height of 13-15 ft., spacing 100-120 ft. on roads up to 30 ft. wide. It accommodates filament lamps of from 60-watt to 200-watt, or 80-watt or 125-watt mercury lamps. Designed for post-top mounting on a 3-in. x 3-in. spigot. The body of the lantern consists of a truncated cone of " Perspex " held between a cast aluminium spigot cap and a spun metal " mushroom " top. Two vertical rods join the spigot to the top. A casting which slides on two rods carries the prismatic glass dome reflector, thus enabling the lantern to be focused for the full range of lamp wattages. A cast finial, spring loaded against the spun alloy top, engages with a bayonet slot within the lantern and holds the complete assembly rigidly. The action of depressing and twisting the finial releases the spun top, enabling the lantern to be dismantled.

(40) Holophane " House-side "

Designed for mounting at a height of 13-15 ft. on the walls of buildings fronting on to narrow streets. The lantern is pear-shaped in front elevation, and is as shallow as possible for use with a 200-watt lamp, the body casting being only 2½ in. deep at the bottom. It is provided with conduit entries at the top and at the two sides. Two fixing lugs are provided. The front of the lantern is secured by four captive bolts, which ensure a weather-proof joint against a tubular rubber gasket; it swings easily to one side for re-lamping and servicing. A new type of prismatic front glass is used to give a non-axial light distribution. The prismatic pattern, which is confined to the inner surface of the glass, forms two beams of light at 75-78 deg. angular elevation and at 160 deg. apart in plan, with some light thrown back on to the mounting wall. Suitable for lamp wattages from 60 watts to 200 watts, including the 80-watt and 125-watt mercury discharge and fluorescent lamps and 45-watt sodium lamps.



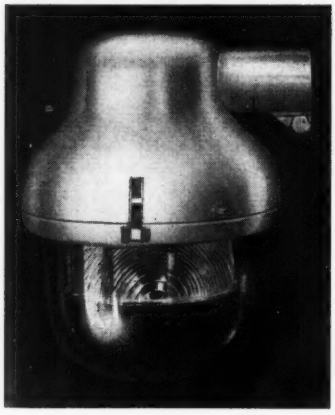
(41) Revo C.14482



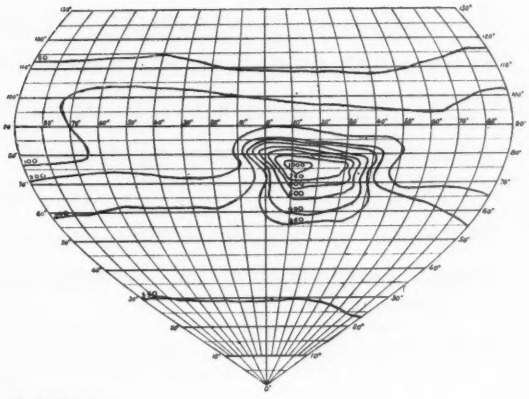
With 200-watt tungsten lamp. Dotted lines—bare lamp; full lines—distribution from lantern. Right-hand curve—vertical through maximum; left-hand curve—distribution through 75 deg. to downward vertical.

This lantern comprises a sheet aluminium dome, and white enamelled cast aluminium reflector, which carries a sheet steel vitreous enamelled inner reflecor arranged to hinge for easy access to the interior of the unit. A detachable directional lens and symmetric type refractor is included; it can also be supplied with Revo patent "kleen prism" type refractor. The unit is designed for 200-watt tungsten lamps, and the whole is supported by twin arm tubular brackets and cast aluminium spigot cap.

(42) Revo C.14407

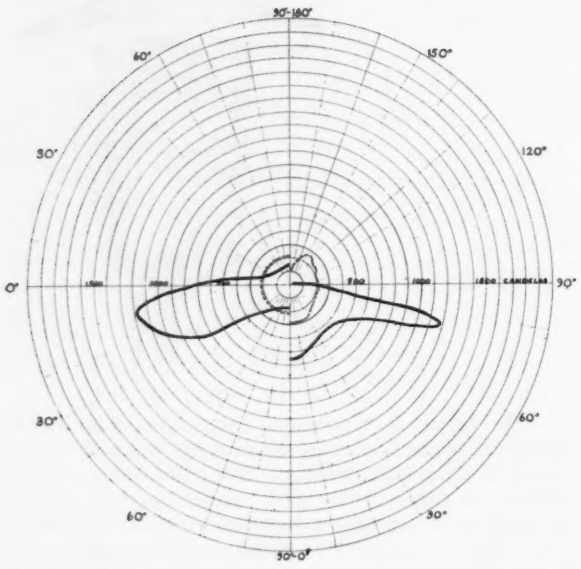


This lantern comprises a die-cast aluminium dome with an inner reflector of vitreous enamelled sheet steel. The reflector is hinged to give easy access to the interior of the lantern. The outer glass is supported by, and retained in, a die-cast aluminium alloy ring which is attached to the dome by toggle action fasteners of stainless steel. Pre-set focusing is provided for 60-, 100-, 150- and 200-watt tungsten lamps, and 80- and 125-watt mercury and fluorescent mercury lamps. The reflector carries a directional lens or symmetric type dome refractor. Also available with bowl type refractor instead of dome refractor and clear outer globe, or as an open type unit with dome refractor only.



With 200-watt tungsten lamp.

(43) Revo "Hatfield"



With 200-watt tungsten lamp. Dotted curve—bare lamp; full curve—lantern distribution. Right-hand curve—vertical plane. Left-hand curve—distribution through 75 deg. to downward vertical.

This lantern, designed on contemporary lines, comprises a sheet aluminium mushroom-shaped canopy, finished green or grey outside, and white inside, and supported by a tubular bracket. Designed for 60-watt to 200-watt tungsten, 80-watt or 125-watt mercury, or 80-watt fluorescent lamps, and incorporates pre-set focusing positions for the respective lamps, together with a patent directional lens, or symmetric type refractor; it can also be supplied with Revo patent "kleen prism" dome refractor, which, with its housing, is easily detachable for access to the wiring terminal. An alternative design can be supplied with a double-armed bracket if required.

Names and addresses of firms whose lanterns are described in the review on pp. 321—342.

The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.

Crompton Parkinson Ltd., Crompton House, Aldwych, London, W.C.2.

The Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2.

Engineering and Lighting Equipment Co., Ltd., Sphere Works, St. Albans, Herts.

Falk, Stadelmann and Co., Ltd., 91, Farringdon Road, London, E.C.1.

The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

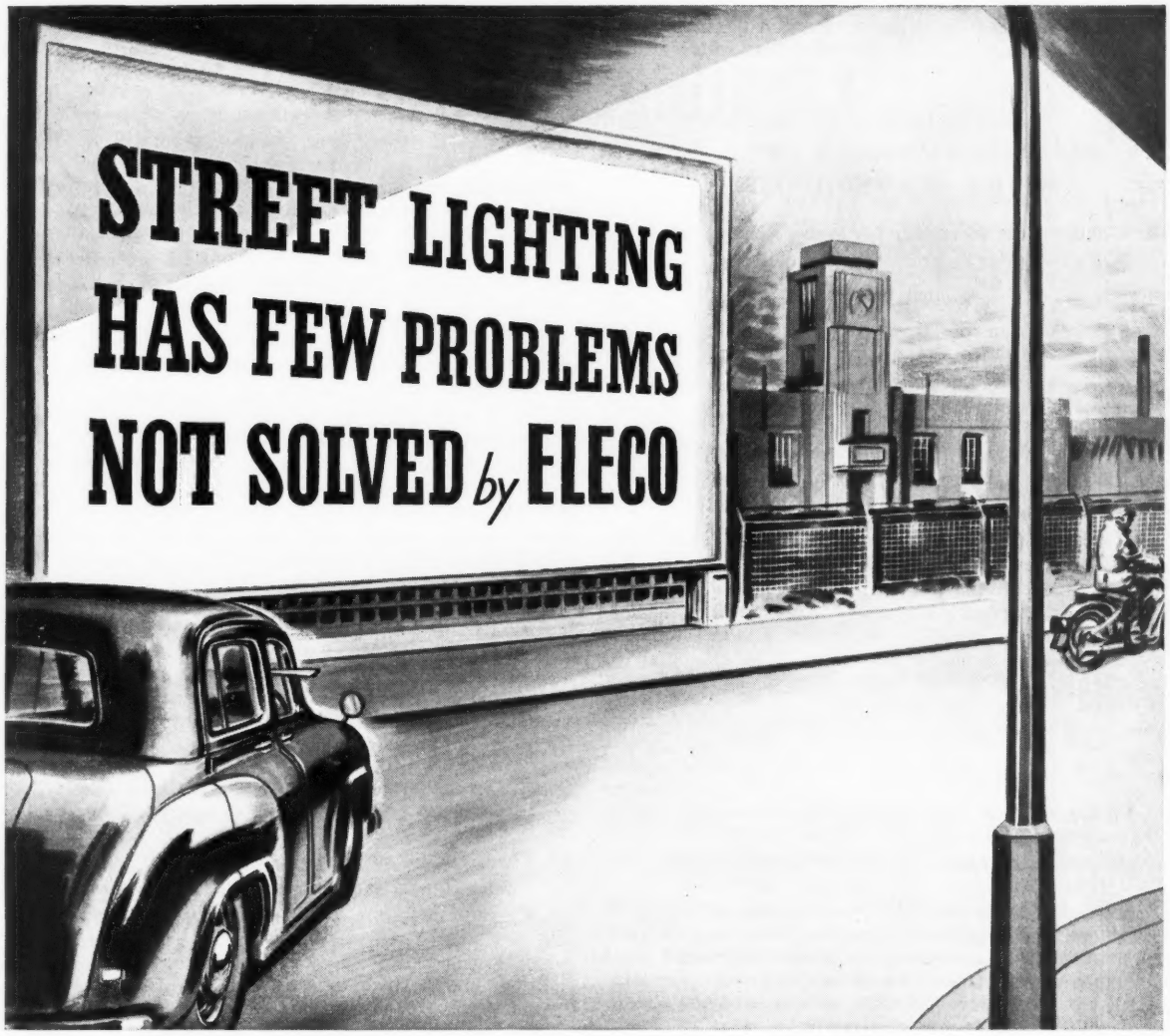
Holophane Ltd., Elverton Street, London, S.W.1.

Metropolitan-Vickers Electric Co., Ltd., St. Paul's Corner, 1-3, St. Paul's Churchyard, London, E.C.4.

Revo Electric Co., Ltd., Tipton, Staffs.

Siemens Electric Lamps and Supplies Ltd., 38-9, Upper Thames Street, London, E.C.4.

Wardle Engineering Co., Ltd., Elsinore Road, Old Trafford, Manchester, 16.



IT COSTS NOTHING TO CONSULT ELECO

FOR WELL over 60 years Eleco have been designing and manufacturing street lighting equipment. This long experience is reflected in the sound engineering construction and high optical efficiency found in all Eleco lighting equipment.

Eleco's unique experience, both in the field and in the laboratory, is at your service — without any obligation to you, of course.

Throughout the country, thousands of street miles, from heavily worked arterial roads to quiet cul-de-sacs, are Eleco lighted. Among these varied jobs you'll find Eleco had just your kind of problem to solve — and they did. And, it costs you nothing to consult Eleco.

ENGINEERING & LIGHTING EQUIPMENT CO. LTD.

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TELEPHONE: St. Albans 2258/59

Lighting Abstracts

OPTICS AND PHOTOMETRY

535.24

90. A photometric laboratory for to-day's light sources.

K. FRANCK AND R. L. SMITH, *Illum. Engng.*, **49,** 287-291 (*June,* 1954).

Describes a new laboratory for the photometry of very large luminaires or of lamps whose light output is sensitive to position. By rotating the light receptor about an arc of 25-ft. radius, the mirrors common to more compact distribution photometers are dispensed with. Rotation of the luminaire and positioning of the photocell are effected by remote control from a separate instrument room. P. P.

628.971.6

91. More tips on lighting photography.

T. KNOWLES, *Illum. Engng.*, **49,** 271-276 (*June,* 1954).

Describes techniques for photographing lighting installations in monochrome or colour. Preservation of perspective in the final print is discussed. An exposure calculator is presented which is used in conjunction with measurements of the luminance range of the scene to be photographed. Data are given on colour-compensating filters for use with two types of colour film when used to photograph installations using seven different kinds of "white" fluorescent lamp. P. P.

628.971.6

92. Photography of street lighting installations and assessment of their quality.

E. REBSKE. *Lichttechnik,* **6,** 255-258. (*July,* 1954.) *In German.*

After explaining the inherent difficulties which attend the use of photography for producing either a true representation of the appearance of a street at night or a luminance survey of the street surface and its surroundings, the author shows how, by taking proper precautions, very useful results can be obtained. The work of Waldram, Bloch and Hopkinson is referred to in some detail and in particular Waldram's densitormeter is described. The use of bloomed lenses for avoiding "ghost" images is recommended; the best focal length is that of the normal camera lens. J. W. T. W.

93. A solid-state image intensifier. 535.215

R. K. ORTHUBER AND L. R. ULLERY. *J. Opt. Soc. Am.*, **44,** 297-299. (*April,* 1954.)

A layer of photoconductive material and a layer of electro-luminescent material are sandwiched between transparent electrodes (e.g., "Nesa" glass) across which is applied a suitable audio-frequency voltage. Illumination of the photoconductive layer increases the voltage across the electro-luminescent layer, which then emits light. A model using an electro-luminescent panel with separate photoconductive cell gave a light-flux gain of 480, and an experimental panel a flux gain of 2. The system works in air, and has possible application in large-screen television and fluorography. E. J. G.

94. A registering low-level photometer. 535.2

W. E. K. MIDDLETON. *J. Opt. Soc. Am.*, **44,** 303-305. (*April,* 1954.)

Describes a portable visual photometer, used for measuring luminance in the range 2.10^{-5} to 5.10^{-2} cd/m^2. A photometric match is obtained by turning a circular optical wedge in front of the built-in comparison lamp. The wedge-settings are recorded by indenting a card, in order that a dark-adapted observer may make a number of settings before reading off the results. E. J. G.

535.2
628.93

95. Radiation characteristics of semicircular, circular and rectangular surface sources.

A. I. MAHAN AND W. F. MALMBORG. *J. Opt. Soc. Am.*, **44,** 644-653. (*August,* 1954.)

Exact formulae are derived, by surface integration, for the illumination at a point produced by semi-circular, circular and rectangular sources radiating according to Lambert's Law. The formulae hold for an elementary receiving area of arbitrary position and orientation. E. J. G.

96. An Ulbricht sphere for large luminaires. 535.24

G. H. SECHRIST. *Illum. Engng.*, **49,** 345-346. (*July,* 1954.)

Constructional details are given of a 10-ft. diameter integrating sphere capable of accommodating 8-ft. fluorescent lamp luminaires. Cost and weight are kept down by using readily available non-metallic materials. P. P.

LAMPS AND FITTINGS

535.81

97. Characteristics of lighting glassware.

A. R. JAEGER, *Illum. Engng.*, **49,** 280-284 (*June,* 1954).

A further article in a series on materials of use to lighting engineers. After describing the basic properties of glass in general, the characteristics of crystal, opal, heat-resistant and coloured glasses are given in greater detail together with the applications to which they have been put by the lighting industry. P. P.

621.329
628.97

98. The design and application of flameproof lighting equipment.

D. A. STRACHAN, *Trans. Illum. Eng. Soc.* (*London*), **XIX,** 169-188 (*No.* 6, 1954).

Reviews the classification of explosion hazards, the means by which inflammable gases and vapours can be ignited and the principles of flameproof enclosure. The design of flameproof fittings is discussed and the testing and certification procedures outlined. There are sections dealing with Statutory Regulations, installation and maintenance, and general and particular applications of flameproof lighting equipment. W. R.

621.327.43

99. A preliminary report on physical processes in the fluorescent lamp which cause radio noise.

H. L. STEELE, JR. *Illum. Engng.*, **49,** 349-356. (*July,* 1954.)

Describes a technique for measuring the spectral energy distribution of the radio noise from fluorescent lamps. Details are given of four types of noise produced by oscillations generated at the anode and cathode of the lamp. An

improvement in the noise level can be achieved by attention to the gas filling and the design of the filaments, but is at present off-set by a shortened lamp life. P. P.

100. Characteristics of mercury in lamps. 621.327.4

L. J. BUTTOLPH. *Illum. Engng.*, **49**, 321-328. (*July*, 1954.)

Describes the history and preparation of mercury and the uses which have been made of the metal in the operation of light sources. The effects of temperature and pressure on the spectral distribution of radiant energy from an electrical discharge in mercury vapour are given in detail. P. P.

LIGHTING

621.327.43
628.972

101. Flicker discomfort in relation to the lighting of buildings.

J. B. COLLINS AND R. G. HOPKINSON. *Trans. Illum. Eng. Soc.* (*London*), **XIX**, 135-158 (No. 5, 1954).

Reports on an experimental investigation into discomfort due to flicker in lighting installations. Model and full-scale experiments are described and results are given based on the multiple criterion technique. The causes of flicker, the variations found in flicker sensitivity, and the conditions affecting the perception of flicker, are discussed, and it is concluded that the flicker problem is not serious in well-engineered installations and affects only relatively few people. W. R.

628.971.6

102. Model investigations of longitudinal or transverse suspension in fluorescent street lighting: a criticism and reply.

E. VON DER TRAPPEN AND E. HALLIER. *Lichttechnik*, **6**, 220. (June, 1954). *In German.*

Von der Trappen criticises the use of small-scale models for investigating street lighting problems, and considers that Hallier's conclusions regarding the superiority of transverse suspension are invalid [see Abs. **71**]. Two main grounds of criticism are (a) that the lighting units are necessarily out of scale, and (b) that the only really satisfactory way to form a judgment of a street lighting installation is to drive down the street, not to look at it from a fixed point. E. Hallier replies with a contention that the defects of the method are not so serious as claimed and that model experiments possess certain definite advantages over full-scale trials. J. W. T. W.

103. Progress in television studio lighting. 628.972

Illum. Engng., **49**, 313-316 (June, 1954).

Reports the progress which has been made in American television studio production lighting since an earlier report on the subject was published in 1951. The use of illumination and luminance meters to assist in correct adjustment of the lighting is discussed. P. P.

621.327.43

104. Suppression of radio interference in fluorescent lighting installations.

G. WALTERS, *Illum. Engng.*, **49**, 295-300 (*June*, 1954).

Various ways in which the stray electric and magnetic fields generated in a fluorescent lamp interfere with radio reception are described. Remedies include screening the lamp with metal shields, short-circuiting the r.f. noise currents by capacitors between the lamp and its luminaire, shunting these currents to earth by capacitors connected to the ballast and attending to the position of the radio receiver and the design of its aerial. P. P.

105. Novel lighting for a trotting race track. 628.971

R. G. WEIGEL, *Lichttechnik*, **6**, 247-250 (*July*, 1954). *In German.*

Describes the new lighting installation for the track at Hamburg-Bahrenfeld. The projectors used are of novel design. The reflector consists of five rectangular sheets of specular aluminium bent into parabolic form in the vertical plane. These are so arranged that the horizontal spread is 40 deg. overall, while the vertical spread is quite small. The 104 projectors used, each taking a 3,000-watt tungsten lamp, are mounted on 60-ft. steel columns. The average horizontal illumination is five and the vertical illumination generally about 10 lm./ft.^{2}. J. W. T. W.

106. Biological effects of light and radiation. 578

R. SCHULZE, *Lichttechnik*, **6**, 250-255 (*July*, 1954). *In German.*

One of the papers read at the annual meeting of the German L.T.G. (see *Light and Lighting*, p. 243, Aug., 1954). The author enumerates the various types of radiation reaching the earth's surface, most of them very much attenuated by absorption in the atmosphere. The exceptions are the visible and near infra-red and a wide band of wave-lengths centred on 1 metre. The different biological effects produced by these radiations, and the effects on the human body of severe deprivation are described. In particular, the effects of artificial irradiation are noted, with special reference to underground workers. J. W. T. W.

621.329

107. New data on lighting equipment maintenance.

J. ROY JONES. *Electrical Construction and Maintenance*, **53**, 84-86. (*Sept.*, 1954.)

The paper discusses new data on the light output depreciation of ventilated and unventilated lighting fittings. Light depreciation curves are given showing the considerably better light output maintenance in relation to operating hours of ventilated as compared with unventilated fittings of various types in both clean and dirty locations. Particular reference is made to the advantage, in this respect, of high bay fittings. Fully enclosed fittings are still recommended for extremely dirty high bay locations. It is also shown that ventilated fittings operate at higher efficiency due to the greater release of light and more favourable operating temperatures. The merits of group lamp replacement are also discussed in relation to tungsten filament, fluorescent and mercury discharge lamps. W. R.

108. Graphical determination of room indexes. 628.93

R. H. RICE. *Illum. Engng.*, **49**, 358-359 (*July*, 1954.)

Presents a Room Index Chart whereby the Room Index or Room Ratio required for an artificial lighting calculation can be read off directly in terms of the room width and length and the mounting or ceiling height. It is claimed that the Chart has the merits of greater accuracy, simplicity and speed of use compared with the more conventional tables. P. P.

109. Lighting the small amateur stage. 628.972

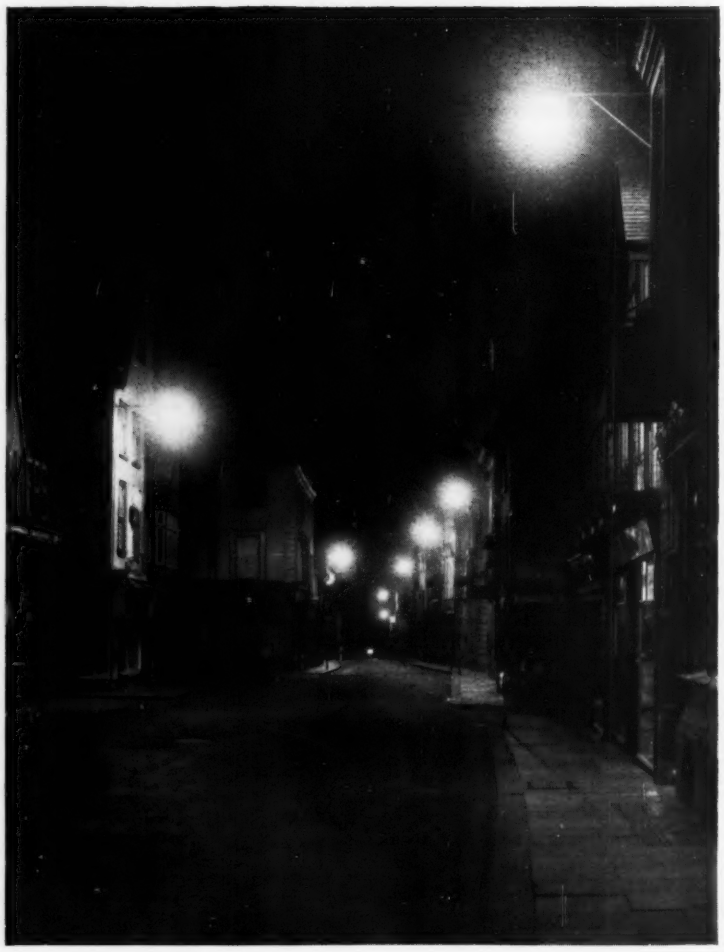
G. A. LONG, JR. *Illum. Engng.*, **49**, 331-338 (*July*, 1954.)

Gives suggestion for the lighting of small stages and includes descriptions of the construction of simple types of control boards and spot and flood lights. Details of the lighting of a number of amateur stages are given. P. P.

Recent Street Lighting Installations

Bury St. Edmunds

The disfigurement of picturesque towns and villages by ill-chosen equipment is the price that has all too often been paid for modern standards of street lighting. An attempt to avoid such disfigurement has been made at Bury St. Edmunds, where modern lighting has recently been installed in parts of the town centre, including the historic streets of Abbeygate and Cornhill. The new installation is so unobtrusive by day that the equipment is scarcely seen by the casual observer. No columns obstruct the footpaths or conflict with the mellow-toned buildings of the town. Instead, discreet designs of wall brackets have been unobtrusively placed and used to carry lanterns of simple but pleasing design. Tungsten lighting was considered the most suitable illuminant for such surroundings, and to provide a modern standard of lighting the use of 500-watt lamps at a mounting height of 25 ft. and with average spacing of 120 ft. was necessary. All the equipment was supplied by Crompton Parkinson Limited, the lantern design selected being the Crompton "Lion." The installation work was carried out by the Bury St. Edmunds District of the Eastern Electricity Board.



Haddington, East Lothian

In their desire to maintain the attractiveness of their ancient town centre, the Haddington Town Council wished to avoid the use of columns and brackets; this also was the view of the National Trust and others who had been consulted when improved lighting was contemplated. The South-East Scotland Electricity Board suggested that consideration might be given to the use of wall-mounted lanterns as had been successfully adopted elsewhere, although in the case of Haddington the problem was somewhat complicated by the varying widths of the road. As a result of discussions a trial installation was erected from which the present scheme evolved.

The scheme now put into operation consists of 28 Revo vertical wall-mounted fluorescent lanterns each housing three 80-watt "warm white" hot cathode fluorescent lamps with instant start gear; all control gear is housed within the lanterns where space is also available for fuses and time switches.

The lanterns are spaced at an average of 80 ft. apart and are fixed to buildings at an overall height of 21 ft. from road level. Although in many cases the road width exceeds 70 ft. between buildings, adequate illumination is obtained down the centre line of the streets. As distinct from conventional street lighting, where the practice is to brighten road surfaces in order that objects may be seen in silhouette, the effect of this method of lighting enables objects to be seen naturally by shape and colour rather than two-dimensionally.

This method of lighting has many advantages in offering an adequate level of illumination with absence of glare by using low brightness sources, freedom from colour distortion, ease of maintenance from ladders rather than towers if required, high light source efficiency and longer life of lamps due to reduction of vibration. Other advantages which appealed to the Haddington Council were the comparatively low load of approximately 300 watts for each lantern and lower annual maintenance costs due to the absence of columns and brackets.

Holborn, London

New fluorescent street-lighting in the New Oxford Street area was switched on earlier this year. This installation for the Holborn Borough Council lights not only New Oxford Street and St. Giles Circus, but also part of Kingsway, Shaftesbury Avenue, Southampton Row, Charing Cross Road and Tottenham Court Road.

In all 108 lanterns are used. They are G.E.C. "Four Eighty" type—wired for instant start. Each lantern houses four 5-ft. 80-watt 240-volt "Daylight" fluorescent lamps. The lanterns are mounted at 25 ft., 86 of them on single-arm columns and 22 on double-arm columns. Spacing between the columns averages 100 ft.

Some of the columns used for the former gas lighting installation were adapted for the new system. Others were removed and re-erected where additional columns were needed. Many columns, span wires and gear were dismantled. All this work was done by the G.E.C. mobile erection squad.

Top: *Shaftesbury Avenue.*

Centre: *Kingsway and Southampton Row.*

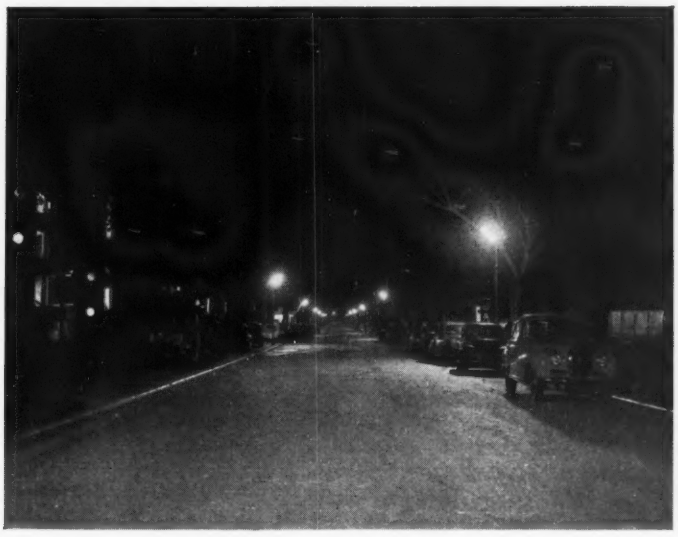
Below: *Charing Cross Road.*

Singapore

The B.T.H. Co., Ltd., have supplied Malaya with £12,000 worth of street-lighting equipment since the war. The photographs of Singapore show sections of the latest schemes in the Tiong Bahru area and Alexandra Road, where "Mazda" fluorescent lanterns, each housing two 2-ft. 40-watt lamps, have been installed. Another installation recently completed is that in Shenton Way, Singapore, which is lighted by 5-ft. three-lamp fluorescent lanterns. More than 160 fluorescent street-lighting lanterns are now in use in Singapore.

Top: *Shenton Way.*

Centre: *Twin-armed column carrying two 2-lamp 2-ft. 40-watt lanterns.*



Below: *Tiong Bahru Road.*

I.E.S. Activities

Leicester Centre

The first meeting of the 1954-5 session of the Leicester Centre of the Illuminating Engineering Society was held on September 29 in the Demonstration Theatre of the East Midlands Electricity Board, when a lecture entitled "Light and other Radiations in Crime Detection" was presented by Mr. C. Harold Edlin, of the Home Office Forensic Laboratory, Nottingham. In the course of his talk Mr. Edlin explained the many forms of light and radiation used in tracking down criminals when only the slightest evidence was available. The two main objects of investigation were detailed examination and the identification of substances and materials involving photographic, microscopic, and spectographic analysis. For this purpose radiation from the entire range of the spectrum is used. Mr. Edlin concluded his most interesting lecture with a number of lantern slides portraying results of many investigations carried out.

Leeds Centre

The opening meeting of the session in Leeds on September 27 took the form of a popular talk for a "Ladies Night," having to be restricted to members and their ladies in view of the limited seating accommodation available. The chair was taken by Mr. L. A. Doxey, Centre chairman, who was congratulated on his installation as president of the A.P.L.E. for the current year. The talk, entitled "Modelling With Light and Colour," was given by the Centre secretary, Mr. J. W. Howell, who dispensed entirely with lantern slides and demonstrated the various aspects of the subject with the assistance of models and dresses, kindly provided by Matthias Robinson, one of the leading stores in the City. Care was taken in the preparation of the address to eliminate, as far as possible, technical terms in view of the lady visitors present, and the success of the meeting was undoubtedly due to this precaution.

The lecture dealt with such problems as colour vision, modelling with white light, the production of artificial light, showing the various light sources on coloured goods, and demonstrated the principles of colour mixing. Dresses in saturated and complementary colours, worn by models, were used to show the effects of colour contrast, simultaneous contrast, whilst movement produced mixing colour shadows. Variations of both front and background lighting provided simple expositions of colour harmony. The talk was couched in non-technical terms to enable the uninitiated to understand the elements of applied colour display. In his concluding remarks the chairman said that although this talk of necessity was non-technical in character, it had proved colourful, interesting and instructive. He congratulated the speaker on his departure from the usual technical discourse to one which all appeared to understand.

The talk was repeated on October 4 at the first meeting of the Leeds Centre to be held in Hull.

Birmingham Centre

The Birmingham Centre opened the new session at Regent House on Friday, September 24. Following previous custom, this opening meeting was devoted to the address of the incoming chairman. The new chairman, Mr. F. W. Haynes, who is chief electrical engineer of a well-known paint and varnish manufacturer, gave a most interesting talk on the intricacies of the production of these commodities. Mr. Haynes supported his remarks with a fine collection of slides and a very good film. During the evening the newly introduced chairman's badge of office was used for the first time. It is very appropriate that Mr. Haynes should be the first to wear this badge as he has for a long time been one of the leading members of the Centre.

Glasgow Centre

The new session started off with a swing on October 7, when Mr. A. H. Young spoke on home lighting. The change of time to 7.30 p.m. seemed to meet with approval, for good support was given by members; a number of visitors were also present. An invitation had been extended to members of the local branch of the Electrical Association for Women, a number of whom were present.

The author of the paper approached home lighting to-day through the developments of the past 15 years, and several members noted the popularity even to-day of some of the 1938 designs. The presentation of changes in design was well done in an entertaining manner. Mr. Young put forward several reasons for the reluctance of householders to instal fluorescent lighting, cost being the main stumbling-block; it was too early to see the effect the new lamp colours would have on the question. A review of Continental and American lighting practice concluded a most enjoyable address, and a stimulating discussion followed in which the ladies took part.

Sheffield Centre

The well-attended first Sessional Meeting was held on October 11, 1954, when Mr. C. J. Chisholm, Street Lighting Engineer of Sheffield Corporation, presented his chairman's address entitled "Public Lighting."

The speaker first compared the improvements in lighting with the advance of civilisation at various periods of the world's history. He then turned to the aims and objects of present-day public lighting, with particular reference to road safety. He stressed that the path of officials in charge of street lighting since the war had not been easy. The financial stress of the times and the need to conserve fuel weighed heavily against street lighting. New work and improvements have been seriously restricted and retarded, and difficulties have arisen in obtaining materials for maintenance and repairs.

Mr. Chisholm said that the vital necessity for good public lighting is now receiving universal recognition, because of the increased volume of traffic and the appalling accident rate. He thought that well-lighted streets can play a big part in reducing accidents which occur during the hours of darkness. Efficient street lighting also facilitates the flow of traffic, helps to stimulate trade in shopping centres, is an added convenience to residents and a valuable aid to the police.

The recommendations of the Ministry of Transport for the lighting of "A" and "B" roads were then dealt with, and some experiments in Sheffield, using 20-ft. columns and 60-watt sodium lamps were described.

Mr. Chisholm concluded with a review of the work of a Sheffield Public Lighting Department.

I.E.S. Forthcoming Meetings

LONDON

November 9th

Sessional Meeting. "Shop Lighting," by R. L. C. Tate. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

November 23rd

Lecture. "Light and Crime Detection," by C. H. Edlin. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

CENTRES AND GROUPS

November 3rd

EDINBURGH.—"The Design and Application of Flameproof Lighting Equipment," by D. A. Strachan. (At the Y.M.C.A. Small Hall, 4, Queen Street, Edinburgh, 2.) 7 p.m.

MANCHESTER.—Annual Dinner. Presidential Address, by E. C. Lennox. (At the Café Royal.) 7 p.m.

NEWCASTLE.—"Sports Lighting Symposium," presided over by W. Robinson. (At the Roadway House, 8, Oxford Street.) 6.15 p.m.

November 4th

GLASGOW.—"The Design and Application of Flameproof Lighting Equipment," by D. A. Strachan. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 7.30 p.m.

NOTTINGHAM.—"The Lighting of Shipyards," by J. S. McCulloch. (At the Demonstration Theatre of the East Midlands Electricity Board, Smith Row, Nottingham.) 6 p.m.

November 8th

SHEFFIELD.—"Lighting for Display," by T. S. Jones. (At the Medical Library, The University, Western Bank, Sheffield, 10.) 6.30 p.m.

November 9th

CARDIFF.—"The Lighting Installation in a Nylon Yarn Factory," by B. C. Robinson. (Joint Meeting with Newport Electric Club.) (At Newport.)

STOKE-ON-TRENT.—Details to be announced.

November 10th

SWANSEA.—"The Electric Lighting in a Nylon Yarn Factory," by B C. Robinson. (At the South Wales Electricity Board's Demonstration Theatre, The Kingsway, Swansea.) 6.30 p.m.

November 11th

BIRMINGHAM.—Ladies' Night. (At the Botanical Gardens Ball Room, Westbourne Road, Edgbaston.)

MANCHESTER.—"Street Lighting Costs," by T. L. Robinson. (At the Demonstration Theatre of the North Western Electricity Board, Town Hall, Manchester.) 6 p.m.

November 16th

GLOUCESTER AND CHELTENHAM.—"Lighting for Enjoyment," by T. O. Freeth. (At the General Electric Co., Ltd., 2, St. Aldgate Street, Gloucester.) 6.30 p.m.

LIVERPOOL.—"Lighting for Production," by J. W. Howell. (Joint meeting with the National Union of Manufacturers and the Federation of British Industries.) (At the Liverpool Engineering Society, 9, The Temple, 24, Dale Street, Liverpool.) 6.30 p.m.

November 17th

LEEDS.—"Industrial Colour-matching Problems," by A. Wilcock. (At the Lecture Theatre of the Yorkshire Electricity Board, 45-53, Sunbridge Road, Bradford.) 6.15 p.m.

NORTH LANCASHIRE.—"The Sense of Sight," by S. Mountain. (At the Demonstration Theatre of the North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"Lighting Aids for Marine Navigation," by K. C. Sutton-Jones. (At the Cleveland Scientific and Technical Institute, Corporation Road, Middlesbrough.) 6.30 p.m.

November 22nd

LEEDS.—"New Lamps, New Uses and New Lighting Techniques," by R. V. Mills. (At the E.L.M.A. Lighting Service Bureau, 24, Aire Street, Leeds, 1.) 6.15 p.m.

LEICESTER.—"The History and Development of Lighting," by L. H. Hubble. (At the Demonstration Theatre of the East Midlands Electricity Board, Charles Street, Leicester.) 6 p.m.

November 25th

BIRMINGHAM.—"Gemology," by F. Hessling. (At "Regent House," St. Phillip's Place, Colmore Row, Birmingham.) 6 p.m.

November 26th

BATH AND BRISTOL.—"Lighting for Enjoyment," by T. O. Freeth. (At the South Western Electricity Board, Lecture Theatre, Old Bridge Street, Bath.) 7 p.m.

November 29th

LEEDS.—Four short papers on Industrial Lighting, by Members of the Centre. (At the Lecture Theatre of the Yorkshire Electricity Board, Ferensway, Hull.) 7.30 p.m

Trade Literature

THE GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2.—Brochure giving a few examples of the improvements which have been made in the performance of Osram fluorescent lamps, including a table giving ratings and pricings of many of them.

MIDLAND SILICONES, LTD., 19, Upper Brook Street, W.1.—Brochure and price list giving the properties and applications of MS4, a non-melting silicone grease for waterproofing and insulating ignition systems and electrical equipment.

EKCO-ENSIGN ELECTRIC, LTD., 45, Essex Street, Strand, W.C.2.—Three new publications. A leaflet giving details and prices of the Ekco White fluorescent lamp designed for industry and commerce. A well-illustrated brochure giving details and prices of fluorescent luminaires, lamps control gear and accessories mainly for industrial and commercial use. The latest Ekco Lamps catalogue giving details and full price lists, including general service lamps, joylights and decoration lights, neon lamps, spotlight and floodlight reflector lamps, tubular, traction and projector lamps.

ALLOM BROTHERS, LTD., Lombard Road, Morden Road, S.W.19.—Two leaflets illustrating the fluorescent square pendant and a fluorescent lamp enclosed in a reeded Perspex cover. Details and prices in each case. A brochure dealing with several features of picture lighting.

THORN ELECTRICAL INDUSTRIES, LTD., 105-109, Judd Street, W.C.1.—Three redesigned and enlarged new catalogues. The first, A.L.129, gives the comprehensive details of all Atlas fluorescent equipment, which includes luminaires for industrial and commercial use, domestic and theatre lighting. The second A.L.130, deals in the same way with lamps and tubes, including general purpose, pigmy, tubular, neon, traction and projector lamps. The third, A.L.131, is of tungsten filament lighting equipment, and includes local lighting reflectors, prismatic bulkhead fittings, flameproof, floodlighting and spotlight fittings as well as domestic and decorative luminaires.

J. E. WILDBORE, LTD., 6-12, Peter Street, High Street, Oldham, Lancs.—Brochures illustrating the Wildbore "Protectafil" complete light designed in conjunction with Protectafil Shock Absorbers, which takes into consideration the aspect of vibration mainly in industrial lighting.

Association Française des Eclairagistes

The proceedings of the A.F.E. meeting, which took place at Monaco in June (reported in our August issue), have now been published in one volume. The papers covered a wide range of subjects including exterior decorative lighting, automobile lighting, street lighting, sports lighting and various aspects of fluorescent lighting. The discussions on the papers are also included.

Copies of the proceedings (price 1,000 francs) may be obtained from the Association Française des Eclairagistes, 33, Rue de Naples, Paris, 8e.

Correspondence

Visual Comfort

To the Editor, LIGHT AND LIGHTING

Dear Sir,—In "Postscript" of your September issue a distinction is made between the feeling of aesthetic pleasure experienced when looking at a well lit scene and the engineering concept of "visual comfort." However, in his last paragraph "Lumeritas" states that he finds crystal chandeliers agreeable, although they break some of the rules of good lighting.

Some months ago I happened to be in Westminster Cathedral with some friends and remarked that the lighting in the Nave was exceedingly bad and uncomfortable, since it consists of a series of elaborate fittings with naked bulbs. My friends would by no means agree, and it turned out that those who find the fittings aesthetically attractive do not, in general, notice the glare.

Similarly, when I like the design of a crystal chandelier, I say that it "sparkles" and when I do not I say that it glares. The illuminating engineer with his equations, tables and slide rule finds himself in a ridiculous position if he tries to persuade the public that attractive and popular forms of lighting are uncomfortable, despite the plainest evidence to the contrary, purely because they do not accord with rules established under conditions in which any aesthetic factors were rigidly excluded.

For these reasons I maintain that no definition of "visual comfort" can be adequate if it excludes aesthetic considerations. Since aesthetics cannot be reduced to simple mathematical expression considered necessary for engineering purposes, either the concept of visual comfort must be dropped, or the study of lighting must become something more than a branch of pure engineering.—Yours, etc.,

Lancing. P. A. JAY.

To the Editor, LIGHT AND LIGHTING

Sir,—I like Mr. Jay's letter. However, there is no constant relation between the comfort or discomfort of what we see with (the peripheral and central visual apparatus) and the aesthetic feeling aroused by what we see. I may appreciate the beauty of a scene and derive much pleasure from it even if I am suffering from sore eyes. The aesthetic feeling aroused by a splendid sunset will still be pleasant despite the fact that, if I am driving "into the sun," it is an effort to see what—in the circumstances—I must look out for, and that "screwing up the eyes" for this purpose is uncomfortable. If the scene pleases me, on account of its beauty, I pay less attention to the discomfort it may also cause me than I would to the same degree of discomfort were it not concomitant with agreeable aesthetic feeling. On the other hand, I can have "visual comfort" (ease in seeing) despite the fact that the scene before me is ugly and unpleasing. Thus, although visual pleasure—in the aesthetic sense—and visual comfort can be, and often are, experienced together, the first of these is not essential for the second.

Of course, being comfortable—visually or in any other way—is pleasant. But the conditions which give us the pleasant feeling of comfort do not have to be those which will also afford us aesthetic pleasure. This is fortunate, for, were it otherwise, the lighting engineer—if not abandoning the concept of visual comfort—would often have to abandon all hope that his best endeavours, as a lighting engineer, could secure this comfort for his "customers."—Yours, etc.,

"LUMERITAS."

Artificial Lighting

To the Editor, LIGHT AND LIGHTING

Dear Sir,—We enjoy reading your magazine very much and find it very interesting and informative. It seems very fortunate that the "language of lighting" is a more or less universal one, and that the aims and activities of the lighting fraternity are so similar on both sides of the ocean.

I would, however, like to take exception to something I have read in your September, 1954, issue—although before doing so I must point out that what I have to say is a purely personal observation and does not necessarily reflect the opinion of my sponsors.

What prompts me to write is your editorial entitled "The Artificial Lighting Season." What I take exception to is merely two words: the word "artificial" and the word "season."

There are still many people over here, too, who use the term "artificial lighting," although it does not seem just to the business we are in. "Artificial," according to the Oxford Dictionary, means "not natural" or "not real." We feel lighting is very "real," and prefer to call it "electric light" or "man-made light," as opposed to daylight.

As for "season"—I realise that more lighting will be used in the winter, especially in residences, but I feel that the implication of the "artificial lighting season" is that the illuminating engineers have nothing to think about during the rest of the year.

Over here, lighting is a year-round business, as I'm sure it must be in the United Kingdom also. Stores, for instance, are constantly lit, even in the daytime; and so also are factories. As a matter of fact, it is becoming an established practice to suggest lighting during the times of the brightest sunlight, in order to avoid the blinding contrast between daylight and an unlighted or dimly lit interior. This also applies to tunnels on auto highways. Even the more advanced residences are being designed to keep these brightness ratios at a minimum.

On the other hand, we have more and more interiors where no daylight is admitted, requiring man-made light at all times. Many factories are now being built without windows. Subways (I think you call them Undergrounds) are, of course, in this category. And now that we have air-conditioning, some residences are being built with windowless walls.

I think it would be well for illuminating engineers to forget that there is, as you call it, an artificial lighting season, and consider their activities as running the year round—being guided, of course, only by how they may better serve mankind by providing for more comfortable

and efficient seeing. I hope you will understand that this letter is written with warm and friendly feelings, and will feel that my "exception" is a mild one.—Yours, etc.,

EDWARD A. CAMPBELL.

Better Light Better Sight Bureau, New York.

Mr. E. A. Campbell's comments on our September Editorial are welcome, even though we think the total usage of artificial lighting in this country during the winter months differs sufficiently from that of the summer months to justify the title we coined. We thought we made it clear that out of "the artificial lighting season" illuminating engineers, so far from being idle, are busy planning installations for providing good lighting. Our correspondent's objection to the word "artificial," as applied to lighting, seems based on a misunderstanding of just one O.D. definition, namely, "not real." But, in this context, "not real" obviously does not mean "non-existent"; the expression is simply equivalent to "not natural," and surely this is true of "man-made" lighting. Another dictionary definition of "artificial" is "contrived with some measure of art or skill, as opposed to what is artless, undesigned, or unskilful." According to this meaning of the word, is not "artificial" a complimentary rather than a derogatory adjective with which to qualify the lighting made by man? "Man-made" lighting is certainly sometimes better than natural lighting *precisely because it is artificial*, i.e., designed rather than artless. No doubt there are people to whom "artificial lighting" is synonymous with "an inferior substitute for natural lighting," but, for them, we feel that "man-made lighting" would also mean just this. In short, "artificial" = "man-made," so what would be gained by substituting the latter for the former?—EDITOR.

Situations Vacant

Fully trained LIGHTING ENGINEER required for London office. Applicant must be well educated and conversant with modern lighting methods. Apply Senior Lighting Engineer, Ekco-Ensign Electric Ltd., 45, Essex-street, Strand, W.C.2.

JUNIOR LIGHTING ENGINEER to assist in preparation of designs for modern interior installations. Commencing salary up to £450 p.a. according to experience. Write giving full details to Box No. 867.

Situations Wanted

REGISTERED LIGHTING ENGINEER desires change. Pre- and post-war experience (12 years). Extensive knowledge of commercial, industrial, shop, and flood lighting. Able to prepare distribution and wiring diagrams for lighting schemes. London area preferred. Box No. 866.

LIGHTING ENGINEER, A.M.I.E.E., Registered (I.E.S.), C. & G. Illuminating Engineering certificates, requires change of post. Able to prepare schemes and designs from own surveys, architects' plans or to customer requirements. Age 36, prepared to reside anywhere in Britain and if necessary to spend part of each year overseas. For further particulars apply to Box No. 868.

Fittings Design

DESIGNER with progressive outlook, inventive but practical ideas, extensive experience of materials and originating designs for all types of lighting fittings for quantity production, would be pleased to hear from electrical manufacturing concern interested in modern incandescent lighting fittings. All replies treated in confidence. Box No. 865.

POSTSCRIPT

By "Lumeritas"

Mithras, to whose honour the Romans built numerous temples besides the one recently unearthed on a bombed site in London, was the god of light among the Persians, but his worship was adopted by the Roman legions and so introduced at Rome as well as in this country when the Roman frontier was extended to Britain. Mithraism has been called "the military religion of the Roman frontier" and is said to have become the most serious rival of Christianity—which undoubtedly borrowed some of its features. The cult of Mithras was a corruption of the earlier Zoroastrian religion of the Persians which was monotheist and elevating and exhorted its adherents to good thoughts, good words and good deeds. Although the Persians recognised a number of good spirits, called Ahuras, according to the teaching of Zarathustra (or Zoroaster), the supreme being, the creator of the world and of the earthly and spiritual life, who alone should be worshipped, is the Ahura Mazda (a name that inevitably brings to mind, now, one of the best known British brands of electric lamp!). Ahuramazda taught the sun and the stars their way, but at a later period Mithras—the Unconquered Sun—came to be worshipped as a deity and to be accorded almost equal honour with Ahuramazda. Also, Mithras seems to have been regarded as a mediator between Ahuramazda and the world of his creation, and this concept of a mediator between God and his people is not only evident in Christianity but is one common to a variety of ancient religious cults. The Magi—priests of the Zoroastrian religion—figure, of course, in the traditional Christmas story—the story of the Nativity. They went to Bethlehem hoping to find the Messiah, Sosiosh, son of Zarathustra, whose coming was foretold in the Zend-Avesta—the sacred books of the Zoroastrians. The central rite of the derived Mithraism was the sacrifice of the divine bull, in order that its vitality (or "salvation") could be obtained by partaking of its flesh and blood. It is for this reason that the anthropomorphous Mithras is represented straddling a bull and plunging a knife into its throat. It is said that the cult of Mithras was suppressed by Gracchus, Prefect of Rome, in A.D. 377, some 200 years after the date ascribed to the temple unearthed in London.

It is expected that the Queen's Speech for the next session of Parliament will mention forthcoming legislation laying down a statutory code of working conditions in shops and offices and of hours of work for juvenile employees in these places. Such legislation was recommended in the Gowers Report on Health, Welfare and Safety in Non-Industrial Employment which was published in 1949, and the proposed Bill will contain provisions requiring, among other conditions, suitable lighting. The enactment of legislation as proposed in the Gowers Report was subsequently urged in the Report on the Lighting of Offices made by the Lighting of Buildings Committee of the Building Research Board. The proposed Bill is not likely to be very controversial, although its discussion in the Committee Stage may well be protracted. Although there are undoubtedly many shops and offices which are already provided with lighting to a better standard than is likely to be statutorily required, there is little doubt that improvements will eventually have to be made in many others. It can be assumed that employers will be allowed a reasonable time in which to meet the statutory requirements after they are made.

The results of a three-year investigation into the value of ultra-violet irradiation in the prevention of bacterial infection in schools have recently been published by the Medical Research Council (M.R.C. Special Report Series No. 283, London, H.M.S.O., price 7s.). The investigation was planned by a Ministry of Health Committee which included representatives of the British Thomson-Houston Company, who supplied the special U.V. lamps and fittings which were installed in three primary schools for the trial. The field research was, however, organised and carried out by members of the Medical Research Council's Air Hygiene Committee, and they have prepared the report. There were 1,550 children in the three experimental schools and 1,860 in three similar schools used as "controls." The schools were visited daily to measure the bacterial content of the air as well as the temperature, humidity and ventilation rate. All absences due to sickness were recorded and an analysis was made to ascertain the absence rates due to different kinds of sickness. It was found that the general bacterial content of the air in the irradiated schools was about 16 per cent. lower than in the control schools, but the content was 70-80 per cent. lower in respect of two kinds of bacteria selected for separate counts. There was, however, no appreciable effect on the total sickness absence recorded for the irradiated schools. There was evidence that absences due to certain diseases were reduced by amounts between 15-45 per cent. These diseases were mumps and chickenpox; asthma; gastritis and gastro-enteritis, and gastric 'flu.; scarlet fever, acute pharyngitis and tonsillitis, otitis media and earache. It also appeared that secondary-attack rates following single-case introductions of measles, mumps and chickenpox were lower in the irradiated schools. But, because the absences due to all these named diseases form only a small part of the total sickness absence, this total was—as mentioned above—only slightly affected by the irradiation. For this reason the Air Hygiene Committee conclude that a wide use of irradiation as a hygienic measure for the control of infection in primary urban day schools does not appear to be justifiable.

When my copy of the October issue of *Light and Lighting* arrived I was agreeably surprised to find it accompanied by a very useful and well-produced Directory of Manufacturers of Lighting Equipment. As I turned the pages of this Directory, I wondered more and more at the number of manufacturers who apparently "hide their light under a bushel" and have not hitherto made themselves and their wares known to me and the many other readers through the pages of the Journal itself. However, my biggest surprise came when I reached the back cover of the Directory and read that *Light and Lighting* "circulates in 46 countries outside Great Britain." Of course I knew the Journal went abroad; but to 46 countries—that's "some going"! Isn't it a record for an independent journal exclusively devoted to lighting?